

DIETETICS  
IN GENERAL PRACTICE

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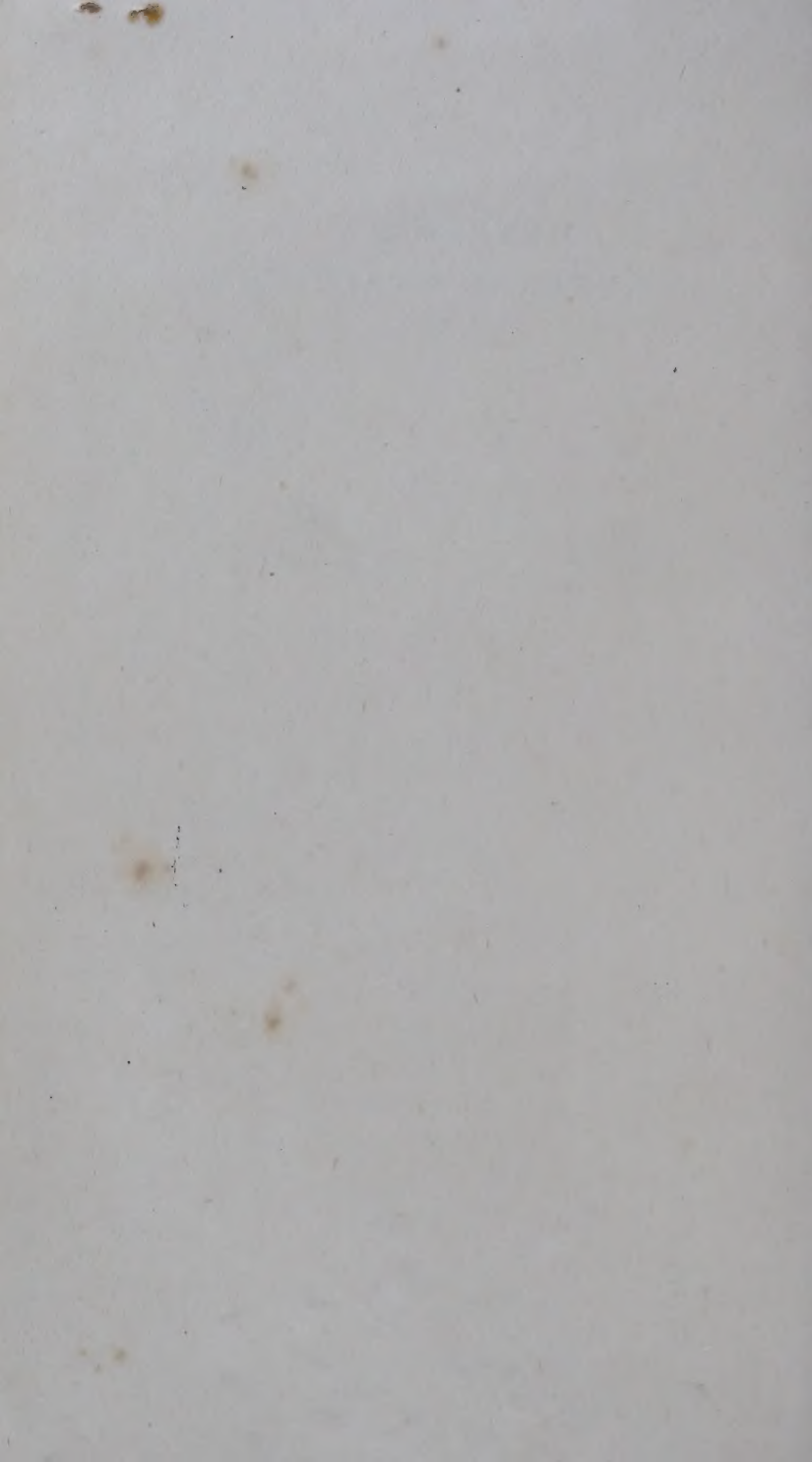
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DIETETICS  
IN GENERAL PRACTICE





# DIETETICS IN GENERAL PRACTICE

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## INTRODUCTION

To order a special diet is a difficult thing to do, and this is because there are so many different kinds of food prepared in so many different ways that to enumerate all those that a patient may or may not take is a laborious undertaking.

In the attempt to do so, the idea for which the diet is given is often lost sight of, and the patient is left with a rather confused list of meaningless taboos. True, such diets often do good, but more by the flavour of distinction they confer than their actual physiological effects. For the general practitioner many books on diet fail from their very attempt at completeness. They are so filled with details of quantities and percentages that the broad principles which they set out to teach are obscured. Another reason why special diets fail is because they are drawn up without reference to the food which the patient has previously been taking. This leads to sudden drastic changes which are often ill tolerated, and a bad beginning spells failure. Careful inquiry as to the food the patient is actually eating should always provide the basis on which a new diet is prescribed, and necessary changes should, where possible, be made slowly.

This book is an attempt to explain the broad physiological (and common-sense) principles on which treatment by diet should be founded and to show clearly how these can be put into practice without confusing the patient with superfluous instructions. To this end, every diet contains a brief summary of its main aims. The actual details then follow, but instructions are qualitative rather than quantitative. With many patients it is unnecessary,

and often impossible, to say how much of each food must be taken, and if the kind of food to be eaten and the way it is to be eaten is stated, and the effects on the patient observed, the quantities are found gradually by experiment. To quote one example: if a patient who needs to reduce weight is told that his main food must be composed of lean meat, fruit and green vegetables, and that he must partake very sparingly of sugar, starches, and fats he will probably, with the help of scales used on himself rather than his food, reduce his weight as successfully as if he were given a much more elaborate diet sheet with detailed instructions as to the amount of each article of food allowed. For the busy general practitioner to make the best use of diet in treatment it is essential for instructions to be simple to give and easy to understand, and it is with this aim that the instructions and diet sheets in this book have been written.

Whenever a special diet is ordered it is wise to remember the seven possible uses of diet and to consider which of these, if any, it serves. They are

- (1) To lessen the work of a diseased organ, e.g. diets for gastric ulcer or nephritis.

- (2) To give excess of certain components when absorption is deficient, e.g. excess iron in hypochromic anæmia.

- (3) To make up for past deficiencies, e.g. high caloric diet in chronic under-nutrition.

- (4) To remedy over-indulgence in the past, e.g. reducing diet in obesity.

- (5) To produce a specific effect by an abnormal diet, e.g. ketogenic diet.

- (6) To stimulate normal physiological activity, e.g. anti-constipation diet.

(7) To cater for idiosyncrasies, e.g. diet in urticaria.

If, after consideration, you find that a diet you have prescribed does not clearly serve any of these uses it should be revised. Finally, remember that every special diet should contain all the essentials of a normal diet and should be enough for the amount of activity which the disease allows.



## PREFACE TO THE SECOND EDITION

THIS book was published only a few months before the outbreak of war. With the advent of rationing, some of the advice given became more and more difficult to put into practice, and even now, more than two years after the cessation of hostilities, many of the diets suggested are reminiscent of more festive days. In the second edition I have not modified diets to meet present stringency because I feel that the physiological approach will help to circumvent the difficulties caused by lack of certain foods. Full use should be made of the extra rations allowed by the Ministry of Food to patients on special diets. Some minor alterations have been made and parts of the chapters on vitamins and diabetes have been rewritten.

## PART I



### CHAPTER ONE

## NORMAL DIET

ALTERATION of diet in one direction may lead to deficiency in another unless the constituents of a normal diet are constantly remembered. This would not be difficult if it were not for the fact that the limits of normal for different people are very wide, so wide that the details of a normal diet are difficult to define. Broadly speaking, it is that diet on which a feeling of health and fitness with normal activity, constant weight, and high resistance to infection are maintained over a period of many years. For the young the test of normal growth must also be applied. How slight variations from normal can cause alterations in structure was well shown by McCarrison in studying the effects of different diets on the histological structure of the thyroid gland. The more normal the diet the more normal the gland, and this certainly applies to other tissues of the body.

The diet needed to produce normality of structure and function varies with race, age, sex, occupation, and climate, and on top of these the requirements of individuals living under the same conditions are very varied.

A normal diet for a patient can, therefore, only be found by a careful enquiry into his mode of life, environment, and diet in the past, considered in conjunction with his present state.

It is essential, however, to have some more concrete standards on which to build a diet, and the

following are essential for every individual:

- (1) Sufficient food.
- (2) Sufficient protein, containing enough of the essential amino acids.
- (3) Sufficient carbohydrate and fat in proper relative proportions.
- (4) All vitamins in adequate amounts.
- (5) Mineral salts, including iron, calcium, iodine and sodium chloride.
- (6) Roughage.
- (7) Water.

These will now be considered in greater detail:

(1) *Amount of food.* The total amount of food required by different people varies much more than books on physiology lead one to suppose. The diet for an "average man", approved by a committee of the Royal Society, consists of 100 gm. of protein, 100 gm. of fat, and 500 gm. of carbohydrate. This has a total value of 3,400 calories. This figure is naturally influenced by occupation, those living a strenuous life requiring more food, and those of sedentary occupation less. The following list<sup>1</sup> shows the energy output of men in different occupations.

	Calories per day
Woodcutter . . .	5,000
Carpenter . . .	3,200
Shoemaker . . .	2,800
Tailor . . .	2,500

As a general rule, women require very much less food than men.

The actual food given should theoretically be slightly in excess of these figures to allow for wastage and failure of absorption. Experience with diabetics shows that many patients can live active

<sup>1</sup> Winton, F. R., and Bayliss, L. E., "Human Physiology" London, 1935.

lives and maintain health and weight on figures lower than these. Remember that these figures are only average, and that remarkable variation is found among different individuals having the same theoretical food requirement. In actual practice, the right amount of food can often only be found by trial and error, and the value of this method must not be forgotten. Patients who are put upon a special diet for some special condition often suffer severely from lack of food because in drawing it up their total food requirements are not considered.

(2) *Protein and essential amino-acids.* There is considerable difference of opinion as to the right amount of protein required, but 100 gm. daily is probably sufficient for the average man leading a moderately active life. Protein is necessary to provide amino-acids to replace those lost by the breakdown of tissue protein in the body. Certain of these, tryptophane, histidine, tyrosine, arginine, and cystine cannot be synthesised in the body but must be provided in the food if health is to be maintained. An allowance of 100 gm. daily is sufficient to cover this loss unless protein breakdown is excessive. Most proteins contain all the essential amino-acids, but there are exceptions. Zein, the protein of maize, lacks tryptophane, and gelatine, tyrosine.

Proteins are also important metabolic stimulants, and this property of stimulating metabolism is called the "specific dynamic action". Amino-acids are not completely oxidised in the body, but the amino ( $\text{NH}_2$ ) group is removed by enzyme action in the liver and converted to urea, which is excreted by the kidneys. The increased activity of these organs with the increased work which it throws on the circulatory system increases oxygen consumption. Protein is also a source of energy, every gm. oxidised in the body providing 4.1 calories. (One



gram. of protein on complete oxidation yields 5.7 calories, but in the body oxidation is incomplete.) It is not converted into fat to an appreciable extent.

The chief protein foods are: Meat, chicken, bird, eggs, fish, milk, and cheese; it is also contained in relatively small amounts in peas, beans, nuts, flour, and some fruits and vegetables. To take a normal amount of protein on a purely vegetarian diet involves taking a bulky diet, and for many people some animal protein is essential for a complete sense of fitness. Protein, therefore, besides providing essential amino-acids is important as a metabolic stimulant and as a source of energy which does not lead to increase in weight. On the other hand, compared with other foodstuffs, it throws extra work on the heart, liver and kidneys, and should not be taken in excessive amounts.

(3) *Carbohydrate and fat in proper relative proportions.* Carbohydrate and fat are the main sources of energy, and the relative amount of each is determined by several factors. For fat to be completely metabolised, some carbohydrates are necessary, and this amount must not fall below that represented by Woodyatt's formula:  $F = 2C + \frac{1}{2}P$  in gram. This, however, is very unlikely to happen on any ordinary diet. Many forms of carbohydrate are light and easily digested, and one gram. oxidised in the body produces 4.1 calories. Carbohydrate is easily converted into fat and stored as such. The chief concentrated carbohydrates are: sugar, cereals, and potato, while they are contained in smaller quantities in milk, fruits, and root vegetables, and in negligible quantities in most green foods. Fat is a concentrated food of high caloric value. One gram. oxidised in the body produces 9.3 calories. The chief fats are: butter, cream, fat meat, cod liver oil, and olive oil. They are important because they are



a concentrated food of high caloric value which can be easily stored. Animal fats are also an important source of vitamin D. The amount given is limited by individual tolerance, which is very variable. Some adults and many children are unable to take more than a small amount without developing symptoms of indigestion, and in ordering a diet it is always wise to err on the side of too little fat to begin with. For most people a carbohydrate fat ratio of 5 : 1 is satisfactory, but for some a smaller proportion of the latter is desirable. In starvation, or when the amount of carbohydrate oxidised falls short of that required to ensure complete metabolism of fat, products of incomplete metabolism,  $\beta$ -oxybutyric acid and aceto-acetic acid are absorbed into the bloodstream, producing acidosis, and are excreted in the urine. This effect is produced much more easily in children than in adults, but may occur in both.

In estimating the relative proportions of protein, fat, and carbohydrate in a diet, the easiest method is to fix first the amounts of protein and fat, and then add carbohydrate according to the total caloric requirements.

(4) *Vitamins*. Vitamins are accessory food factors present in certain foods which are essential for health. By concentration and purification it has been shown that only very small amounts are needed to maintain health, and their energy value is negligible. Diseases resulting from vitamin lack are called deficiency diseases, and although marked examples of such conditions are comparatively rare now in this country, considerable evidence has been brought forward to show that mild degrees of deficiency are responsible for a great deal of chronic ill-health. It is important to remember this in prescribing special diets and to take care that restric-

tion does not inadvertently lead to vitamin deficiency. On the other hand, in the years following their discovery their importance was overstressed at the expense of the quantity of food given, and patients, particularly babies, were given excess of vitamins, but not enough food.

At present eight vitamins are of sufficient clinical importance to be discussed here. The others are outside the scope of this book.

**Vitamin A<sup>1</sup>:** Vitamin A is found chiefly in green vegetables, particularly spinach, cabbage, lettuce, brussels sprouts, green peas, watercress and asparagus, and also in carrots, and maize, and in smaller amounts in many fruits. Chemically, it is closely allied to the yellow pigment carotene, which is present in many vegetables, and is formed in the liver from this. It is also present in cod-liver oil, butter, egg-yolk, and other animal fats. It is not appreciably destroyed by boiling. Omission from the diet causes cessation of growth, and eventually death, with increased liability to infection. Xerophthalmia, a form of conjunctivitis with night blindness, may occur, and it has been suggested that its deficiency predisposes to many of the common infections.

Normal daily requirements: Infancy to 12 years, 1,500-4,500 i.u. Adults: 5,000; pregnancy (latter half) 6,000; lactation 8,000 i.u.<sup>2</sup>

*The Vitamin B complex:* The most important vitamins which make up this complex are: Vitamin B1 (thiamin), Vitamin B2 (nicotinic acid), and riboflavine. These are often, but not invariably, found together, and not in parallel amounts.

Vitamin B1 is found chiefly in dried brewer's

<sup>1</sup> For vitamin and salt content of foods reference has been made to: Poulton, E. P., "Diets and Recipes." 1937. London.

<sup>2</sup> Food and Nutrition Board, National Research Council

yeast, wheat and barley germ, oatmeal, whole wheat, peas and beans. Marmite is a useful method of giving it. Deficiency is a part cause of the polyneuritis met with in such conditions as beri-beri, chronic alcoholism, cachectic states, and chronic intestinal infections.

It is important to remember that these may arise like other vitamin and dietetic deficiencies, not only because the amount in a diet is below the theoretical normal, but because in spite of a normal intake absorption is poor. Thus chronic alcoholic gastritis, by causing failure of absorption, may lead to peripheral neuritis. Normal daily requirement<sup>1</sup>: Infancy to 12 years: .4-1.2 mg. Adults: 1.2-2.3 mg.

Vitamin B2 is found chiefly in yeast, Marmite, liver, meat, milk, and to a less extent in green vegetables. Deficiency in human beings causes pellagra, a condition characterised by symmetrical dermatitis of skin exposed to sunlight, and gastro-intestinal and nervous symptoms, both mental and paralytic. In this country pellagra results more commonly from refusal to take a proper diet by mental defectives, or from failure of absorption through chronic gastro-intestinal disease. Normal daily requirement: Infancy to 12 years: 4-12 mg. Adults: 12-23 mg.

Riboflavine is found chiefly in liver, lean meat, milk, eggs, and green vegetables. Deficiency is suggested by photophobia and lesions on the lips and at the angles of the mouth (cheilosis), vascularisation of the cornea, and smoothness of the tongue. Normal requirement: Infancy to 12 years: .6-1.2 mg. Adults 1.8-3.3 mg.

Owing to the close association of these three vitamins, it is clear that they may all be deficient and combined clinical effects may occur.

<sup>1</sup> Food and Nutrition Board, National Research Council.

**Vitamin C:** This vitamin has now been isolated and prepared in its pure form, ascorbic acid. It is present in large amounts in oranges, lemons, grapefruit, tomatoes, and in black currant purée, rosehip syrup, the juice from swedes, and to a lesser extent in many fresh fruits and green vegetables. It is relatively stable to heat, but is easily oxidised, particularly in the presence of alkali, a condition which often obtains when green vegetables are boiled after the addition of soda. Deficiency in man causes scurvy, a condition characterised by hæmorrhages into the skin, mucous membranes, and periosteum, bleeding from the gums, anæmia, lowered resistance to infection, and, in children, extreme irritability. Normal daily requirement: Infants and children up to 12: 30-75 mg. Adults: 75-100 mg.

**Vitamin D:** This vitamin has also been isolated and prepared in its pure form, calciferol. It is formed *in vitro* by the action of ultra-violet light on ergosterol, and can be synthesised in the body by the action of light in the same manner. It is fat soluble, and is found in association with Vitamin A in animal fats. Cod-liver oil and halibut-liver oil contain the largest amounts, but it is also present in butter, milk, and other animal fats, the quantity depending on previous diet and exposure to sunlight. Vegetable fats do not contain it. It can most conveniently be given in the form of cod- or halibut-liver oil or in its pure form, or alternatively by exposure to sunlight or ultra-violet light. Vitamin D is essential for the absorption of calcium, and deficiency causes rickets. This is a disease characterised by abnormal and irregular growth of cartilage at the epiphyses with deficient deposition of calcium phosphate in the bones, which in consequence become soft and deformed. Calcification of the teeth is also defective; the low blood calcium



leads to hyper-excitability of the nervous system, so that convulsions, tetany and laryngismus are produced, and there is a tendency to anæmia, with a lowered resistance to infection. In adults deficiency causes osteomalacia, a condition somewhat similar to rickets. Normal daily requirement: Infants under 1 year and lactating and pregnant women 400-800 i.u.; others up to 400 i.u.

**Vitamin E:** Vitamin is fat soluble, and is present in vegetable oils, particularly wheat-germ oil, cereal embryos and in green leaves. Experiments on rats and mice have shown that its absence causes sexual sterility with atrophy of the germ cells in the male and partial failure of the reproductive processes in females. Evidence for its importance in man is so far rather indefinite. It is a stable vitamin, and can be stored to a considerable extent in the body.

**Vitamin K:** This vitamin is found chiefly in hog-liver fat, fish meal, rice bran, soya-bean oil, young oat shoots, and alfalfa, but it is widespread in the normal diet of man, occurring principally in green leaves. It is also formed by intestinal bacteria, which provide a second source of supply. Deficiency causes reduction of prothrombin in the blood, and when this falls to about 25 per cent below normal it causes a hæmorrhagic state which is cured by giving either Vitamin K or synthetic compounds of similar chemical composition. It is fat soluble, and deficiency results from failure of absorption rather than lack in the diet. This happens most frequently when there is diminution of bile in the intestine, as in obstructive jaundice or liver disease. Hæmorrhagic disease of the newborn is also due to Vitamin K deficiency, and can be prevented by giving 2 mg. daily to the mother for a few days before the confinement, or cured by injecting the child with 1-2 mg. intramuscularly immediately after birth.



Under civilised conditions it is unusual to meet with gross examples of vitamin deficiency. There is, however, considerable evidence to show that minor degrees, often probably of several vitamins at the same time, are not uncommon. A fat-free diet, for example, may be associated with deficiency of Vitamins A and D, a low residue diet of Vitamin B, and certain gastric diets of Vitamin C. If these dangers are realised they can be prevented by giving additional vitamin-containing foods or concentrates. Mild degrees of vitamin deficiency probably account for a great deal of ill-health and lowered resistance to infection. When deficiencies are suspected the diet should be corrected, and, for a time, the vitamin or concentrate given as well. The likelihood of failure of absorption must be considered also and the dose raised accordingly. In some pathological conditions many times the normal dose has to be given before a satisfactory response is obtained. An example of this is in late rickets, in which 100,000 units of Vitamin D may be needed daily to promote healing. In health there is no evidence to indicate that excess above normal is beneficial.

(5) *Inorganic constituents.* Of the normal inorganic constituents of a diet, iron, calcium, iodine and sodium are the only ones in which deficiency is met with. The other inorganic salts are distributed so widely in different kinds of food that they are not under ordinary conditions deficient.

**Calcium:** Calcium is present in bone as calcium phosphate and calcium carbonate. It is also present in blood, partly as ionised calcium and partly in combination with protein. In the ionised form it is important for the normal activity of nerves and muscles and for the clotting of blood and milk. It is eliminated from the bones by the hormones of the

parathyroid and thyroid glands. For proper absorption of calcium Vitamin D is essential, and gross excess of this vitamin may lead to excessive absorption and abnormal calcification. Calcium is present in milk and cheese, and in meat, fruit, vegetables and nuts to a lesser extent. Deficiency, although it may be the result of insufficient calcium in diet, is usually caused through lack of absorption from deficiency of Vitamin D.

**Iron:** Iron is a constituent of hæmoglobin, and is therefore essential for respiration. It can only be absorbed in its inorganic form, and when in organic combination has to be reduced first to the ferrous state. This is accomplished by the hydrochloric acid of the stomach, and so in achlorhydria absorption is deficient and anæmia due to iron-lack develops. The daily requirement of iron by an adult is approximately 15 mg.; this, however, is increased at certain times, particularly in women during menstruation (when the loss of iron may be very much increased), during pregnancy, and also during lactation. If, therefore, the intake of iron on the diet is a bare minimum, symptoms of iron-lack are likely to appear at such times, when the demands for iron are greater than usual. Inorganic iron preparations are readily absorbed when given in large quantities by the mouth, and there is evidence that iron can be stored in the body in large amounts in an apparently inert form. It is present in considerable quantities in organic combination in red meat and green vegetables. When, however, there is iron-lack it should be remembered that this is better remedied by giving large doses of inorganic iron rather than foods which are known to contain it.

**Iodine:** Iodine is a constituent of thyroxin, the hormone of the thyroid gland. This is the chief

metabolic stimulant of the body, and the oxygen consumption depends largely on the amount of thyroxin secreted. In certain places, usually mountainous districts a long way from the sea, there is insufficient iodine in the water, and hence in the food. This lack causes a compensatory hypertrophy of the thyroid gland, a condition known as goitre. In children and young animals such goitre can be prevented by the addition of an appropriate amount of iodine to the diet, usually added in the form of iodised salt. In other cases goitre is produced not because iodine is lacking, but because it is not properly absorbed. Prolonged iodine lack, in addition to causing goitre and hypothyroidism, predisposes to other thyroid disorders, such as myxœdema and, in children of goitrous parents, cretinism. Although goitre can be prevented in the young by giving prophylactic iodine, to give excess iodine to a patient with long-standing goitre may have the reverse effect, the output of thyroxine being increased and hyperthyroidism produced.

**Sodium:** Sodium is present in the body chiefly in the form of sodium chloride and sodium bicarbonate. Its most important function is to preserve the osmotic equilibrium of the body fluids. Considerable loss of sodium chloride takes place from sweating, and this is the cause of miner's cramp.

McCance has shown that a salt-free diet combined with excessive loss of sodium chloride induced by sweating produces profound muscular weakness analogous to that occurring in Addison's Disease. In both conditions, restoration of the sodium of the body fluids to normal by excessive salt in the diet, cures the symptoms.

(6) *Roughage*. "Roughage" is the name given to foods which leave a residue which acts as a mech-

anical stimulus to the intestine. It is mainly provided by the cellulose present in fruit and vegetables, the husks of cereals and nuts, and is important for maintaining tone in the intestinal muscle and preventing constipation.

(7) *Water*. Water is absorbed mainly by the large intestine and is lost in the urine, sweat and fæces. It is an essential constituent of the body, and in health the amount is kept within normal limits by the kidneys. Many people drink too little water for health. The daily need varies very much with activity and climate, but should not usually be less than two pints daily, and often much more. Fluid is best taken in the form of water, either plain or flavoured with fresh fruit juice, before or between meals. Strong tea, coffee and alcohol, which are often taken in excess, are not good substitutes. Too little fluid is one of the causes of constipation, and also results in a concentrated urine predisposing to the deposit of crystals in the urinary tract, with irritation and formation of calculi.

Thirst is produced by dryness of the mouth, either from local drying or general lack of fluid. It is a reliable indication that water is needed, and there is then hardly any contra-indication to giving it. It is a prominent symptom in conditions which cause loss of fluid, such as sweating in fever, loss of blood, or polyuria. In treatment, restriction of fluids should rarely be pressed to such a degree as to cause thirst.



## CHAPTER TWO

### COMMON DIETETIC FAULTS

AT the present day there are many ways in which food is a menace to health. This is due partly to defects in quality and quantity, partly to the way it is prepared, and partly to the conditions under which it is eaten.

Under modern conditions diets often contain insufficient hard food needing mastication: this is serious, because mastication helps to develop the teeth and keep them healthy and to exercise the jaws. Probably much dental trouble is due to this lack. A great deal of food eaten to-day need not be chewed at all, for it slips down without effort. Absence of roughage, because food is too refined in preparation and cooking, is another serious deficiency. This means that, after absorption, insufficient bulk reaches the large intestine to make it work, and the bowel muscle becomes weak and toneless in consequence, and constipation develops. The common use of white bread instead of brown bread is important in this respect.

Diets to-day commonly contain too little fresh food. This does not only apply to fresh fruit and vegetables, although their importance is very great, but also to the excessive use of tinned and preserved fruits and meats.

A great deal of food, particularly meat, is over-cooked, and the habit of heating up cold meat is bad because it leads to loss of nutrient value and increased difficulty in digestion. Vegetables also are frequently over-cooked.

Many people take too little water to drink, and this is one of the causes of constipation. On the



other hand, much too much fluid is often drunk with meals.

The balance between protein, fat, and carbohydrate is very often wrong. Many people, as a result of greed, habit, or too good a table, take too much meat. Others, again, take too large an amount of starch, and, more rarely, fats are taken in excess. These faults are partly due to the fact that food is often too rich and courses too numerous, so that people are encouraged to eat more than they need.

The habit of drinking strong tea and coffee too much and too often is common, and is one of the causes of gastric irritation. Both these drinks are excellent, provided that they are not taken in excess, but abused they are a common cause of dyspepsia. Condiments and highly flavoured foods in excess also cause gastric irritation. Alcohol is another gastric irritant, particularly when it is taken, as are sherry and cocktails, on an empty stomach before meals.

Tobacco in excess can also do harm to the stomach. Hurst has shown that cigarette smoking increases the secretion of hydrochloric acid, so that smoking, particularly on an empty stomach, is contra-indicated in people with a tendency to hyperchlorhydria. As a result of smoking and chewing tobacco, irritants are swallowed which do harm in the same way.

Many ill-effects, however, are caused not by the quality or quantity of food, but by the conditions under which it is eaten. For digestion and absorption to be normal it is important for the body and mind to be in a state of rest. It is desirable that there should be a short period of inactivity before a meal, that the meal should be eaten slowly so that there is plenty of time for thorough mastication and that it should be followed by a further period of

rest during which digestion and absorption take place unhindered. During exercise and nervous excitement the sympathetic system is stimulated, and this causes vaso-constriction in the splanchnic area, with shunting of blood into the muscles, brain, heart and lungs. During digestion, however, when blood is required in the abdomen, the splanchnic vessels should be given a chance to relax so that the digestive organs may be ready for digestion and absorption. A further effect of stimulation of the sympathetic system apart from its vaso-constrictor action is to inhibit the motor activity of the stomach and intestines and close the sphincters, thereby putting the bowels in a state of rest. This is not the condition under which meals should be eaten. Hypersensitive people who are worried and anxious probably maintain this state of gastric and intestinal inhibition for long periods, and it is not surprising that their digestion suffers. In others, in whom the activity of the para-sympathetic system predominates, the reverse effect is produced, and worry and anxiety lead to increased motility and secretion of digestive juices.

It does not need very much thought to see how commonly these standards are forgotten to-day.

## CHAPTER THREE

### THE TEETH

To diet a patient without treating dental troubles is in many cases a waste of time. Teeth are a common contributory cause of gastro-intestinal disorders, and much disease elsewhere in the body. With normal teeth, food when it reaches the stomach has been entirely changed, but with septic or inefficient teeth, apart from becoming infected, it may be hardly altered.

Teeth in the adult should be considered from two points of view: (1) efficiency; (2) sepsis.

(1) To do their work there must be a sufficient number of teeth in opposition, for a tooth without an opposite number is very little use. An efficient mouth should contain at least four molars and four premolars, or eight premolars in apposition, as well as canines and incisors. If there are less than this, false teeth should be advised in most cases. When these become necessary every effort should be made to avoid extractions, and the common practice of taking out a number of sound teeth in order that a complete set of false ones may be provided is to be deplored. Dental difficulties require this in some, but in many it could be avoided.

(2) Septic teeth are a common cause of gastro-intestinal and other disease. This is especially so in patients with hypochlorhydria or achlorhydria, because without the antiseptic barrier of hydrochloric acid, infection from the mouth can pass through the stomach into the intestine. Septic teeth should be removed before they have time to infect others. If, however, there is extensive dental sepsis treatment should be cautious, for the results of whole-

sale extractions at one sitting are often disastrous.

In patients with gastric or duodenal ulcer dental treatment is extremely important, but it is undesirable to pull out many teeth during an acute exacerbation, and more so when the patient cannot afford a temporary set and has to remain edentulous for several months. In such cases, good can be done by careful removal of the worst offenders and scaling and cleaning the remainder. Dental treatment can be finished later when the patient is fitter. It is important to remove tartar regularly, because this is a nidus of infection predisposing to disease of the gums and pyorrhœa.

In many patients it is difficult to say whether teeth should be removed or not. Many factors must be taken into consideration, and a decision should often only be reached after consultation between dentist and doctor. When there is real doubt it is better to be conservative than to extract unnecessarily. The anthropologist of the future when investigating remains of the inhabitants of Britain in the first half of the twentieth century will undoubtedly comment on the large number of young adult skeletons with no teeth.

To ensure the development of sound teeth in the child three things are necessary:

- (1) A normal diet containing all vitamins, especially Vitamin D.

- (2) Plenty of calcium, either in the diet or as calcium lactate.

- (3) Plenty of roughage and hard food to exercise the teeth and jaws from an early age.

It is important to avoid sticky sweets between meals.



## CHAPTER FOUR

# GASTRO-INTESTINAL DISORDERS

## FUNCTIONAL GASTRIC DISORDERS

MANY patients, especially those who are introspective, complain of abdominal symptoms which are not due to organic disease or to any demonstrable abnormality of secretion. These may be varied and inconstant, and although they sometimes fit a diagnosis of organic disease, full examination and investigation fail to reveal abnormality. Diagnosis can often be made from a careful history and examination alone, but in some, more thorough investigation by X-rays, fractional test meal, and occult blood tests are also necessary to exclude organic disease. More thorough investigation is sometimes necessary to reassure the patient, and may be the only way of getting rid of the anxiety on which the symptoms depend. In many such patients a careful history which must include full details of the food they eat and the conditions under which they eat it, the exercise they take and its relation to meals, and the worries and anxieties that afflict them is enough to supply an answer to the problem. Often it will be found that they are guilty of some or many of the common dietetic faults mentioned in the chapter on that subject (page 24), and that advice on how to correct these mistakes, with reassurance, will be sufficient to put them right. It may be found, for example, that a business man who has one hour for lunch is accustomed in that time to cycle from his office to his home, a distance of two miles, eat a heavy lunch consisting of meat and vegetables, pudding and cheese, with a pint of beer, and then cycle back



again almost immediately, smoking his pipe on the way. Added to this he may be anxious and distracted by the problems of the morning while he is eating his meal. Here the substitution of a light lunch of egg sandwiches and coffee, eaten in a leisurely manner at or near his office, with time to rest in peace both before and after, may dissipate his indigestion. The instructions to be given to patients whose dyspepsia is the result of bad habits are epitomised in the diet sheet on page 32. Many will be found to respond without needing further treatment.

Gastric flatulence, with frequent and often noisy eructation of gas, is a common symptom of nervous dyspepsia. Theoretically it may be due to deficient absorption of gas in the stomach or to gastric fermentation with increased production of gas. The latter may occur from organic disease such as pyloric obstruction, but in such cases there will usually be other signs to point to this. The great majority are due to aerophagy, or air swallowing. This is an extremely common habit, and a patient drifts into it imperceptibly without being aware that he is doing it. In attempting to bring up wind which he thinks is there, he swallows more, and so a vicious circle is produced and the symptoms grow worse. Treatment consists in explaining clearly to the patient exactly what is happening and warning him that he must on no account attempt to relieve himself in this way. The symptoms then often get less and in many disappear. It is also important for food to be eaten slowly under tranquil conditions, that meals shall be small in bulk and taken dry, and that large amounts of fluid shall not be drunk.

*Hypersthenic dyspepsia.* In this form of dyspepsia there is hyperchlorhydria with an over-active stomach. It occurs commonly in active, vigorous

men who work hard, play hard, and eat fast. Often they are excitable and highly strung. The symptom chiefly complained of is a sinking sensation, or fullness in the epigastrium when the stomach is empty which is relieved by food. This may at times amount to actual pain, and the resemblance to duodenal ulcer may be very close. When symptoms are severe or persistent the possibility of duodenal ulcer should be suspected, and further examination by X-rays, occult blood tests, and fractional test meal carried out. Treatment of hyperchlorhydria must be based on a careful history which includes details of diet, smoking, and mode of life. This will often reveal dietetic, physical or emotional indiscretions which, when corrected, lead to cure (see Chapter II). If, in spite of this, symptoms persist more drastic dietetic restrictions will be necessary. To inhibit the secretion of acid the main indications are: restriction of meat and meat extracts, pickles, spices, condiments, and all rich and highly flavoured foods. Fats are allowed freely because these inhibit the secretion of acid. Starches and sugar are allowed in moderation. Alcohol is a stimulant to secretion, particularly on an empty stomach, and should be avoided, and strong tea and coffee should be forbidden. It is particularly important to avoid hard, tough, and mechanically irritating foods and to see that meals are eaten slowly under conditions of physical and emotional rest. Cigarette smoking, particularly on an empty stomach, stimulates the secretion of hydrochloric acid and should therefore be reduced, and only allowed after meals. (For details of diet see page 33.)

Some physicians advocate giving plenty of protein, with a view to fixing the excess acid. If this is done, the amount of starchy food should be limited. This alternative method may be tried if the first fails.

*Asthenic dyspepsia.* In this there is hypochlorhydria, or achlorhydria, and an atonic stomach. It is frequently met with in debilitated patients, particularly women with a bad posture and visceroptosis but also occurs in a certain percentage of apparently normal individuals. Anæmia of the microcytic type is a common accompaniment, and is secondary to deficient iron absorption resulting from lack of hydrochloric acid in the stomach. The chief symptoms are loss of appetite and feelings of fullness or of sinking sensations both during and after meals. Treatment must first be directed to cure the accompanying ill-health and to correct posture and visceroptosis by exercises and an abdominal support. The diet should be nourishing, and consist of frequent small meals taken dry, so that the stomach is not distended with bulky foods or excess fluid. Tender meat, meat extracts, well-flavoured foods, and condiments should be allowed as they stimulate the secretion of gastric juice. Starchy foods should be crisp and limited in amount, toast, rusks, and Ryvita taking the place of bread. Heavy or sloppy puddings should be avoided, and vegetables and fruit only allowed in smaller amounts. The tendency to anæmia from lack of iron must always be remembered and, when present, additional iron should be given for long periods in large doses. Mild degrees of vitamin deficiency are also liable to be present in these patients and additional vitamin concentrates are often useful. (For details of diet see page 34.)

#### INSTRUCTION FOR SIMPLE DYSPEPSIA

- (1) Take four meals daily at regular times.
- (2) Do not eat between meals.
- (3) Eat slowly and masticate thoroughly.
- (4) Do not eat immediately after violent exercise or excitement.

- (5) Rest for ten minutes before and twenty minutes after meals.
- (6) Do not over distend the stomach either by taking too many courses or too much of one course.
- (7) Do not eat very hot foods.
- (8) Do not drink large amounts of fluids with meals.
- (9) Avoid tough or irritating foods such as tough or twice-cooked meat, fibrous vegetables, nuts, strong tea and coffee, excess spices, pickles and condiments.
- (10) Avoid foods which are known to disagree.
- (11) Do not take alcohol on an empty stomach.
- (12) Do not smoke on an empty stomach.

## DIET FOR HYPERCHLORHYDRIA

### *Aims:*

- (1) To avoid articles of diet such as meat and meat extracts, and habits such as smoking, which encourage the formation of hydrochloric acid.
- (2) To give foods containing fat, which stop the production of hydrochloric acid.
- (3) To give food at frequent intervals so that free acid is not allowed to act on an empty stomach.

### *General instructions:*

Obey the rules for simple dyspepsia (page 32).

#### *Take*

Plenty of milk, butter, cream, olive oil.  
Tender red meat, not more than once daily.

#### *Avoid*

All heavy and rich foods.  
Excess of red meat.  
Tough or twice-cooked meat.  
Meat extracts in soups and gravies.  
Strong tea, strong coffee.  
Pickles, spices, condiments, and highly flavoured foods.



## SPECIMEN MENU

*Breakfast*

Weak tea or coffee with half milk.  
Porridge or cereal with milk, cream and sugar.  
White fish or egg dish.  
Toast and butter.  
Jam, honey or marmalade.

*Mid-morning*

Glass of milk and a plain biscuit.

*Lunch*

Omelette or white fish. Green peas.  
Stewed pears and ground rice.  
Biscuit and butter.  
Home-made lemonade.

*Tea*

Bread and butter. Jam or honey.  
Plain cake.  
Weak tea with half milk.

*Dinner*

Vegetable soup.  
Tender stewed steak. Mashed potatoes and cauliflower.  
Caramel custard and cream.  
Roe on toast.  
Weak coffee with cream and plenty of milk.

*Bedtime*

Warm milk or Ovaltine or cocoa made with milk.

DIET FOR ATONIC DYSPEPSIA WITH  
HYPOCHLORHYDRIA*Aims:*

To produce a nourishing diet of small bulk which will stimulate the formation of digestive juices.

*General instructions:*

- (1) Obey the rules for simple dyspepsia (page 32).
- (2) Avoid starchy foods and fats, except in limited amounts, and large or bulky meals.
- (3) Take meals dry and fluids between.



*Take**Avoid*

Dry meals.

Tender lean meat, brains, tripe, sweetbreads, chicken, bird, fish, meat jelly, meat extracts.

Milk (not more than  $\frac{1}{2}$  pint daily) — preferably skimmed.

Butter (two ounces daily).

Eggs (one daily).

Cane sugar, glucose, honey, fruit jelly.

Toast, rusks, stale bread, plain biscuits, plain cake, potatoes, fruit, green vegetables, salads (in strict moderation).

Fluid with meals.

Fats, olive oil, cream, dripping, fat meat, and salad dressings.

Fried fish, fried potatoes, and other fried foods.

Sausages, sardines, salmon, cheese.

All puddings containing flour or suet.

Cereals, such as rice or semolina.

Yorkshire pudding, pastry, rich cakes, buns, porridge, thick gravies and soups.

Strong tea, strong coffee.

Aerated mineral waters, alcohol.

## SPECIMEN MENU

*On Rising*

Two tumblers of water.

*Breakfast*

Grapefruit and sugar.

Tender lean ham. Toast with a little butter.

Marmite. Fruit jelly or marmalade.

Weak tea with milk and sugar (one cup).

*Mid-morning*

Bovril and biscuit.

*Lunch*

Steamed white fish. Mashed potato. Tender greens.

Castle pudding with jam sauce (small helping).

*Tea*

Toast and butter. Honey.

Plain cake and plain biscuits.

Weak tea with milk (one cup).

*Dinner*

Clear meat soup.

Tender roast beef, French beans, one potato.

Baked apples with sugar.

Additional fluid (water, home-made lemonade or orange-ade) can be taken if required between meals.

## GASTRIC AND DUODENAL ULCER

The cause of gastric and duodenal ulcer is unknown, but some of the predisposing factors are well recognised.

Ryle has shown that approximately 8 per cent of normal individuals have an abnormally high secretion of free hydrochloric acid, and it is thought that these patients are particularly predisposed to ulceration. Other important causes are dental sepsis, and insufficiency, and dietetic indiscretions. Of the latter, the conditions under which food is eaten are probably as important as the kind of food. Irregularity and haste over meals, with long intervals between, excessive alcohol and smoking (particularly before meals), too much meat (especially when tough or twice cooked), an anxious temperament with continuous worry and anxiety—all these are important. Such factors become more dangerous when the general health is debilitated for any reason and resistance to infection is lowered.

When the diagnosis has been confirmed treatment may be divided into two stages: (1) Concentrated treatment under conditions of complete rest, which causes the ulcer to heal superficially; and (2) after-treatment. During the first stage the patient is under close medical supervision, and it is not at this time that failure usually occurs. The second stage, however, presents a much more difficult problem because the patient is thrown upon his own resources. Relapse commonly occurs because his doctor does not make him realise that an ulcer cannot be regarded as tightly healed for at least six months after treatment has begun, and that any indiscretion during this time may cause it to break down again. Further, even after the ulcer may be regarded as firmly healed the patient must be made to remember

that the very fact of having had one is a warning that he may develop one again, and it therefore behoves him to be more careful in certain ways than other people. Many of the failures of medical treatment are due to the fact that instructions about after-care have not been fully explained to the patient.

The principles governing the treatment of an active gastric or duodenal ulcer are as follows:

(1) *Rest.* Complete rest in bed is desirable for the first two to four weeks, according to severity. Limited activity may then gradually be allowed, but violent physical exertion should not be taken for six months. During the first few weeks particularly it is extremely important for treatment to be carried out under conditions of mental rest. All emotional excitement and worry should as far as possible be eliminated, and visitors should be carefully controlled.

(2) *Diet.* The aims of the diet are:

To inhibit the secretion of hydrochloric acid and neutralise any which does occur, so that free acid is never allowed to act on the ulcer.

To give a diet sufficiently nourishing and well balanced to maintain health and promote healing, and to give this in such a form that all mechanical and chemical irritation is avoided.

These objects are attained by giving bland, non-irritating foods of fluid or semi-fluid consistency at frequent intervals throughout the day, and also less frequently at night. A high proportion of fat is given on account of its inhibitory effect on gastric secretion. By giving small feeds at frequent intervals no chance is given for free acid to escape neutralisation, and this is the importance of giving at least one feed during the night. Frequent small feeds also allow a fairly full diet to be given without risk of the stomach being stretched.

Some physicians prefer to give a considerable amount of protein in a non-irritating form, with the idea that it will fix any free acid which is formed. In this case less starchy foods are allowed. Others give less protein and more farinaceous foods.

Archer and Graham<sup>1</sup> and others have recently shown that gastric diets are particularly liable to be deficient in Vitamin C, and for this reason orange juice or ascorbic acid should always be given so that this danger is avoided.

In gastric and duodenal ulcer anæmia is often present, and as the usual ulcer diet is deficient in iron, and the neutralisation of hydrochloric acid diminishes its absorption, additional iron should always be given in large amounts after the first week of treatment provided that there are no contra-indications.

Because of its stimulating effect on the secretion of hydrochloric acid, smoking should be entirely forbidden.

The teeth should be carefully examined at the beginning of treatment from the point of view of efficiency and dental sepsis. The importance of thorough oral hygiene and of efficient false teeth, when these are necessary, cannot be over-stressed. Every case, however, must be considered on its merits, and extensive removal of doubtful teeth is to be avoided, especially during the early stages of ulcer treatment. (see Chapter III.)

After two to four weeks the amount of food is increased and more solid food is given, and the patient is allowed to get up and do a little more every day. At the same time the number of feeds is diminished. At the end of four to eight weeks he is allowed a full bland diet which contains plenty of fat, milk, cream, butter and olive oil, fish, chicken,

<sup>1</sup> Archer, H. E., and Graham, G. *Lancet*, 1936, 2, 364.



eggs, farinaceous foods and tender fruit and green vegetables, given preferably in the form of purées. Meat, meat extracts, and substances likely to stimulate the secretion of gastric juices are avoided, and care is taken that nothing is taken which could mechanically irritate the stomach. Although this can be partly ensured by careful preparation of food, meals eaten slowly with efficient teeth or dentures are the more certain way of attaining it.

After four to eight weeks comes the end of active treatment, and with the return to normal life and work the patient is thrown largely on his own resources. His future now depends on how far he obeys the rules which have been given him. Drastic dietetic restrictions are no longer necessary, but if healing is to be complete, and cure permanent, certain simple rules must be obeyed. These particularly concern the way food is eaten, and its accompaniments, as well as the food itself. The following diet sheet (page 43) summarises these rules, and a copy should be carefully explained and given to every patient who has an ulcer before he is allowed to resume normal life. Even if a patient has been treated surgically the same rules apply, for even after removal of a gastric ulcer the same tendency to ulcer remains, and ulcers which recur after surgical treatment are an even more difficult problem than those which have been treated medically.

The foregoing remarks are general, but the principles enunciated form the basis of many systems of ulcer treatment. Of these only three will be referred to briefly.

**The Lenhartz Diet:** This is a graduated diet of high caloric value (over 2,000 calories at the end of fourteen days) designed to combat the anæmia and weakness associated with ulcer. It contains much

protein to combine with the hydrochloric acid. Eggs and milk form the basis of the diet.

**The Sippy Diet:** This is a graduated diet, of which milk and cream form the basis in the early stages. To neutralise hydrochloric acid, large doses of alkali are given frequently after the feeds, and belladonna is given before to inhibit gastric secretion.

**The Meulengracht Diet<sup>1</sup>** is a much fuller diet, designed to combat the exhaustion and dehydration in patients with hæmatemesis and melæna. It will be discussed more fully under these headings.

*Hæmatemesis and melæna.* In "Recent Advances in Medicine", published in 1931, Beaumont and Dodds advocate the following dietetic treatment for patients with hæmatemesis and melæna: "No food must be given by the mouth for at least two to four days. The toilet of the mouth must be carefully attended to, and the mouth may be rinsed out from time to time with water. Ice should not be given to the patient to suck. The bowels should be opened by an enema, and rectal salines containing 2 per cent glucose given in amounts of 6 oz. to 8 oz. every four hours." They mention the alternative method of giving Lenhartz diet from the start while the bleeding is still going on, but consider that this is physiologically an unsound procedure. During the last few years opinion has veered more and more in favour of giving a fuller diet from the very start, and during the last few years Meulengracht's method of giving a bland diet of over 3,000 calories from the very beginning of treatment, even though bleeding may still be going on, has received more support. Reasons stressed in support of this treatment are: the harmful effects of deprivation of food and fluid in patients suffering from hæmorrhagic shock, and

<sup>1</sup> Meulengracht, E., *Acta. med. scand.* Suppl. 59, 375 *Lancet*, 1935, 2, 1220.

their liability to die from exhaustion; the dangers of keeping the stomach empty of food, so that free acid is able to act on the ulcer; and the fact that the presence of food seems to act as a hæmostatic. Practical support for this view is found in the good results reported by Witts<sup>1</sup> and other observers. These compare very favourably with those obtained by more conservative methods. Although many will still question the desirability of carrying this method of treatment to the extreme advocated by Meulengracht, there is little doubt that frequent small feeds from the beginning, such as egg and milk and bland farinaceous foods, are a great advance both from the comfort of the patient and the results obtained. There is little doubt that this method will soon supersede that of prolonged or even limited starvation.

## FIRST DIET FOR GASTRIC OR DUODENAL ULCER

(The first two to four weeks.)

### *Aims:*

- (1) To give a full well-balanced diet in a bland fluid or semi-fluid form to increase weight, to maintain strength and raise resistance to infection.
- (2) To give fats to stop the formation of hydrochloric acid.
- (3) To give feeds at frequent intervals so that free hydrochloric acid does not act on an empty stomach.
- (4) To give sufficient vitamins.
- (5) To avoid over-distension of the stomach.

### *General instructions:*

- (1) Rest in bed for two to four weeks.
- (2) Give feeds with clockwork regularity.
- (3) Do not give feeds very hot, or very cold.
- (4) Stop smoking.

<sup>1</sup> Witts, L. J., *Brit. Med. Journ.*, 1937, 1, 847-852.

*Details:*

Give six to twelve ounces of one of the following at 8 a.m., 11 a.m., 2 p.m., 5 p.m., and 8 p.m.:

Milk, citrated milk, peptonised milk.

Egg and milk (one egg to  $\frac{1}{2}$  pint of milk).

Custard (one egg to  $\frac{1}{2}$  pint).

Benger's food, blancmange, groats, ground rice, cornflour, arrowroot, milk jelly.

The above may be flavoured with Horlick's malted milk, Ovaltine, Bournvita, fruit syrups, sugar, cocoa. Cream may be added to feeds to the limit of tolerance.

At 10 p.m., 2 a.m., and 6 a.m., give six ounces of citrated milk, if awake.

If tolerated, give  $\frac{1}{2}$  to 2 tablespoonfuls of olive oil three times daily between meals.

Give daily the juice of two oranges diluted with double the amount of water and sweetened with sugar.

After the first week large doses of iron should be given for anæmia, which is present in many patients.

## SECOND DIET FOR GASTRIC OR DUODENAL ULCER

(After two to four weeks.)

*Aims:*

(1) To give a full bland diet to maintain strength and raise resistance to infection.

(2) To give plenty of fat to stop the formation of hydrochloric acid in excess.

(3) To avoid long periods without food so that hydrochloric acid does not act on an empty stomach.

(4) To avoid over-distension of the stomach.

(5) To give sufficient of all vitamins.

*General instructions:*

(1) Obey the rules for simple dyspepsia (page 32).

(2) Grade slowly from First Gastric Ulcer Diet to this, adding solid foods gradually and avoiding sudden changes in quality or quantity.

(3) Avoid very hot food.

(4) Take meals regularly.

(5) Rest before and after meals.

(6) Do not smoke.



*Take*

Cream, butter, olive oil,<sup>1</sup>  
milk, eggs.  
Steamed fish, minced  
chicken, brains, tripe.  
Stale white bread, rusks,  
thin crisp toast.  
Refined cereals, such as  
groats, ground rice,  
semolina, cornflour.  
Custard, junket, blanc-  
mange.  
Cane sugar, glucose, honey,  
syrup, fruit jelly.  
Light baked puddings.  
Mashed potato.  
Plain biscuits, plain cake,  
sponge cake.  
Fruit juices (strained and  
diluted with sugar).  
Tender stewed apples.  
Tender sieved or puréed  
vegetables.  
Strained vegetable soup.  
Weak China tea.  
Marmite.  
At a later stage tender  
underdone mutton, beef  
and other meat may be  
added carefully.

<sup>1</sup> Peanut oil may be used as a substitute for olive oil.

*Avoid*

All fried foods.  
Tough, fibrous, or twice-  
cooked meat, cold meat,  
veal, pork, bacon, sau-  
sages, game, cold roast  
chicken.  
Smoked fish, haddock,  
herrings, mackerel, sal-  
mon, sardines.  
Cheese.  
Meat extracts in soups and  
gravies.  
Wholemeal bread, brown  
bread, Ryvita, digestive  
biscuits.  
Porridge.  
Suet, Yorkshire pudding,  
and all heavy puddings.  
Pastry, currant cake.  
All fruit, vegetables, and  
salads which are tough,  
fibrous, or contain pips  
and skins.  
Mushrooms.  
Pickles, sauces, condi-  
ments, except salt.  
Strong tea, strong coffee.  
All alcohol, cider, aerated  
mineral waters.

## SPECIMEN MENU

*Breakfast*

Poached eggs.  
Toast and plenty of butter.  
Honey or fruit jelly.  
Weak China tea with half milk.

*Mid-morning*

Milk and sponge cake.

*Lunch*

Steamed fillet of plaice. Melted butter.  
Mashed potato, puréed peas (small helpings).  
Blancmange and cream.  
Orangeade (strained) made with fresh fruit and sugar.

*Tea*

Toast or rusks with plenty of butter. Honey or fruit jelly.  
Plain cake.  
Weak China tea with half milk.

*Dinner*

Strained vegetable soup.  
Stewed tripe. Puréed carrots. Mashed potato.  
Baked chocolate soufflé.  
Plain biscuits and butter.  
Home-made lemonade.  
Coffee with plenty of milk and cream.

*At bedtime*

Warm milk.

*During the night*

Milk if there is indigestion.

#### AFTER-TREATMENT OF GASTRIC AND DUODENAL ULCER

Rules to be followed by any patient who has had an ulcer treated either medically or surgically in order to prevent recurrence.

- (1) Take four meals daily at regular times.
- (2) Do not miss meals and if there is indigestion between take a small feed of milk.
- (3) Take milk at bedtime and during the night if there is indigestion.
- (4) Eat slowly and masticate thoroughly.
- (5) Do not eat immediately after violent exercise or excitement.
- (6) Rest for ten minutes before and twenty minutes after meals.
- (7) Do not over-distend the stomach either by taking too many courses or too much of one course.
- (8) Do not eat very hot food.
- (9) Do not drink large amounts of fluids with meals.
- (10) Avoid all tough or irritating foods such as tough or twice-cooked meat, fibrous vegetables, figs, nuts, vinegar, pickles, meat soups, and excess condiments.
- (11) Avoid foods which are known to disagree.

- (12) Do not take alcohol on an empty stomach.
- (13) Do not smoke on an empty stomach.
- (14) Keep the bowels regular.
- (15) Have the teeth attended to regularly.

Remember that as much harm can be caused by the way food is eaten as by the kind of food, and that carelessness may undo the work of months of careful diet.

### CARCINOMA OF THE STOMACH

The duration of life in carcinoma of the stomach is variable, and treatment, if not surgical, is symptomatic. Sometimes progress is not so rapid as expected, and by giving as full a diet as possible much can be done to prolong life and activity and lessen the misery which results from profound weakness and under-nutrition.

Patients should be encouraged to take as full a diet as they are able of the type suggested for gastric and duodenal ulcer ( (2) page 42). Meals should be appetising, and there is no need to restrict any plain nourishing food which they are inclined to take.

### CONSTIPATION

Constipation is a condition in which there is delay in the excretion of the contents of the bowel. This occurs most commonly in some part of the large intestine. There is considerable physiological variation in the rate at which a meal is digested, absorbed, and the residue evacuated, so that the term is a relative one. Usually, however, this happens in from 24 to 48 hours, and if this limit is exceeded constipation may be said to be present. The actual frequency of stools is not an entirely reliable guide to diagnosis, for while an incomplete action may occur two or three times a day with constipation,

complete reflex emptying of the colon may only take place on alternate days in patients who cannot be said to have any abnormality of function. What actually constitutes constipation can only be determined by study of each patient. The rate of passage of bowel contents can be found roughly by giving charcoal biscuits immediately after a meal and noting the times of appearance of the first black motion.

It is unfortunate that many members of a civilised community are constipated, but more unfortunate that if they read their newspapers they are never allowed to forget to treat it by purgatives. The unhappy minority of individuals whose colons are more sluggish than their fellows' are encouraged to toe the line with the rest in acquiring a daily bowel action, and if they fail in this they are likely to live under a slight sense of guilt. On the principle of the greatest good for the greatest number, public opinion is perhaps correct, but there is hardly any condition it is more desirable to treat by diet and physical methods first before resort is had to drugs.

Constipation may be due to organic or functional disease. It is not proposed to deal with the former here, but it should be remembered that any comparatively sudden alteration in bowel habit, particularly in older people, without a satisfactory explanation, calls for thorough investigation to exclude organic disease before treatment on simple lines is pursued.

Constipation may be due to:

- (1) Disorders of nervous control of the bowel.
- (2) Weakness of the muscle of the bowel.
- (3) Unsuitable diet and insufficient fluid.
- (4) Lack of exercise.

(1) *Disordered nervous control of the bowel* may be due to many different physical and psychological causes, but the commonest predisposing factor is



irregularity of habit. Normally, the contents of the large intestine, after dehydration, are held up at the sigmoid flexure until some stimulus such as more food entering the stomach initiates a reflex movement—the gastro-colic reflex—which causes them to descend to the rectum. When this occurs the desire to defæcate is aroused, and if this is not held in check by the voluntary sphincter at the anus, reflex emptying of the whole of the descending colon follows. The more often a reflex is elicited the more easily it is produced, and in this fact lies the secret of the importance of a daily action produced by a certain stimulus. A conditioned reflex is established, the condition being a particular time after a particular meal. This is why regularity of mealtimes and habit is important in treating constipation. If, on the other hand, the urge to defæcate is frequently ignored, the conditioned reflex is lost, and fæces accumulate in the rectum, which loses its sensitivity. A state is finally reached in which its contents are incompletely expelled, at irregular intervals, by voluntary effort. This condition is called dyschezia, and if it develops, the whole co-ordinated neuro-muscular mechanism of the bowel may be upset, leading to irregular intestinal spasm, and in patients of a certain type to muco-membranous colitis.

(2) *Weakness of the muscle of the bowels* may be congenital, due to debilitating diseases of all kinds, or lack of work, from an unsuitable diet. The latter will next be discussed.

(3) *Unsuitable diet.* Civilised food is so refined by processes of preservation, preparation or cooking that the constituents which provide bulk, such as the husks of cereals or the cellulose of fruit and vegetables, are largely removed. The result is that by the time a meal reaches the large intestine there

may be little residue left to stimulate the intestinal muscle, so that stasis and intestinal atony occur. Under these conditions, in process of time the muscle is liable to become permanently weak. In some cases this atony may be accentuated by lack of Vitamin B, which is mainly present in the husk of cereals, and if these are lacking, may not be supplied in any other form. Lack of this vitamin has been shown to cause intestinal atony in animals.

Fat in the duodenum normally stimulates the secretion of bile, and when it is deficient in the food lack of biliary secretion causes constipation. The lubricating action of fats and soaps in the intestine and the irritation of fatty acids also, have a laxative effect which is lost. Finally, a considerable amount of fluid is required. Many people do not drink enough water, but take excess of strong tea which is astringent and constipating.

(4) *Lack of exercise.* Exercise affects the bowels activity in two ways. It is important in helping to cause a regular action of the bowels by its immediate stimulating effect on the muscles and circulation. For this, physical jerks, walking, riding, golf and tennis are all excellent, It is equally or more important for its remote effects on growth, posture and freedom of movement. The association of postural degeneration, visceroptosis, obesity, and constipation is too common to be ignored, and in treatment the effects of exercise and diet can only achieve the best results if they are considered together. Both for its immediate and remote effects, regularity in taking enough exercise must be strongly stressed.

Treatment: From this brief consideration of the chief factors causing constipation it is clear that to prescribe a diet is not enough. The best results will only be obtained if at the same time rules are given about correction of posture and exercise.

An anti-constipation diet should aim at providing extra bulk in the form of whole cereals, such as whole-meal bread, Ryvita, bran or porridge, fruit and vegetables; extra fats in the form of butter and cream; and extra fluids. At the same time, the importance of regularity of meals and exercise should be stressed, and of regular attempts to secure a daily motion.

A clockwork régime on these lines will give success with a minimum of purgation in many cases.

When treatment is first begun it must be remembered that a patient who has been taking a diet with very little roughage may not take kindly to a sudden increase. This is more the case if constipation has been prolonged and associated with bowel irritation, intestinal spasm and colic, or even bouts of diarrhoea from secondary colitis. Again, if the intestinal muscle has lost its tone it may be quite unable suddenly to deal with a large increase in bulk. In severe cases, therefore, alteration in diet and exercise should be gradual and extra roughage should be provided in a soft non-irritating form such as sieved or mashed fruit and vegetables, the amount being small at first and increased gradually according to how well it is tolerated. Great care must be taken to avoid food which will leave tough hard or irritating residue, and to begin with most reliance must be placed on increased fluids, fats and Vitamin B in the form of Marmite or some concentrated preparation. When it is necessary to increase bulk, agar-agar may be given first, and sieved or mashed fruit and vegetables added carefully later. In this way it is possible to work up gradually to a full anti-constipation diet containing plenty of roughage, and in doing this the muscle of the bowel will be slowly re-educated to do its work without the assistance of intestinal irritants.

For the treatment of constipation on these lines two diets are suggested: an anti-constipation diet containing plenty of residue for use in patients with a comparatively healthy bowel; and a soft anti-constipation diet for use when the bowel wall is atonic or there is colic or evidence of intestinal irritation. It is important to grade from one to the other, and not make sudden changes (see page 51).

With treatment on the above lines, instructions about regular exercise, regular meals, and regular habits should also be given, and patients who have a bad posture and visceroptosis should be given a course of suitable exercises and encouraged to continue these. In some cases an abdominal belt is very useful.

### SOFT ANTI-CONSTIPATION DIET

#### *Aims:*

To prevent constipation by giving:

- (1) Plenty of fluid.
- (2) Plenty of fat.
- (3) Bulk in a non-irritating form.
- (4) Vitamin B.

#### *General instructions:*

Meals should be regular.

#### *Take*

One pint of water, orange juice and water, or lemonade made with fresh lemon juice, on rising.

Extra water between meals and at bedtime.

Tender fruit and vegetables, sieved or puréed.

Brown or wholemeal bread (if tolerated).

Plenty of butter, cream, olive oil.

Marmite.

#### *Avoid*

Pips, skins, and all tough or fibrous parts of fruits, vegetables, and meat.

Raisins, currants, nuts, Ryvita.

Strong tea, strong coffee.



## SPECIMEN MENU

*On Rising*

Juice of two oranges (strained) in water.

*Breakfast*

Apple purée (large helping) and cream.

Bacon, eggs, or fish.

Brown bread, butter and honey.

Weak tea with milk.

*Mid-morning*

Glass of water.

*Lunch*

Fish or meat. Mashed potato.

Creamed or puréed vegetables (large helping).

Gooseberry fool and cream.

Home-made lemonade.

*Tea*

Wholemeal bread or scone. Butter and fruit jelly or

Marmite.

Plain cake.

Weak tea with milk.

*Dinner*

Vegetable soup (strained).

Roast chicken. Potato.

Creamed or puréed vegetables (large helping).

Prune jelly and cream.

*Bedtime*

One pint of water.

## ANTI-CONSTIPATION DIET

*Aims:*

To prevent constipation by giving:

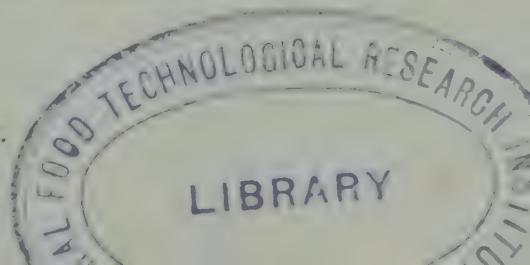
(1) Plenty of fluid.

(2) Fruit, vegetables, and wholemeal bread to produce roughage and Vitamin B.

(3) Plenty of fat.

*General instructions:*

Meals should be regular.



*Take**Avoid*

One pint of water, orange juice and water, or lemonade made with fresh lemon juice, on rising.

White bread.  
Strong tea.

Extra water between meals and at bedtime.

Raw fruit: such as apples, oranges, bananas.

Salads, green vegetables, potatoes cooked in their jackets.

Brown or wholemeal bread, Ryvita, bran, Marmite.

Plenty of butter, cream, olive oil.

## SPECIMEN MENU

*On Rising*

One pint of water, or water with juice of one orange and sugar.

*Breakfast*

Raw apple.

All-Bran with cream and milk.

Brown bread with plenty of butter. Marmalade.

Weak tea or coffee with half milk.

Other dishes to taste.

*Mid-morning*

Two tumblers of water or lemonade.

*Lunch*

Green vegetables or salad (large helping).

Brown bread or Ryvita with butter.

Fruit salad made with fresh fruit.

Home-made orangeade or lemonade.

Other dishes to taste.

*Tea*

Brown bread or Ryvita with plenty of butter.

Jam or fruit.

Weak tea with milk.

*Dinner*

Green vegetables or salad (large helping).

Brown bread and butter.

Home-made lemonade or orangeade.

Coffee with cream.

Other dishes to taste.

*Bedtime*

Two tumblers of water.

## DIARRHŒA

Diarrhœa is a symptom due to the abnormally rapid passage of intestinal contents through the small or large intestine. As a result the stools are more fluid than normal, and usually more frequent. It is important to differentiate between true diarrhœa and frequent defæcation due to other, causes such as dyschezia or irritative conditions of the rectum and anus. It may be a symptom of many different functional and organic disorders of the intestinal tract itself, or secondary to disease in other parts of the body. Dietetic treatment depends on the cause, and in every patient this must be diagnosed as accurately as possible.

The main causes will first be considered, but it is well to remember that several of these may operate at the same time.

(1) *Nervous causes.* Excessive stimulation of the motor nerves to the bowel is a common cause. The muscle of the bowel is supplied by the sympathetic and parasympathetic systems, the former inhibiting movement and closing the sphincters, and the latter increasing activity and relaxing sphincters. Overstimulation of the latter, which occurs either as the result of chronic worry or acute anxiety, is a common cause of diarrhœa, and examples are "Examination" diarrhœa, that occurring in competitors

before a race or in soldiers under shell fire. Reflex nervous irritation from disease in one part of the alimentary tract may be the cause of over-activity of the bowel. Diarrhœa from chronic appendicitis or cholecystitis are examples of this. The nervous control of the stomach and intestines is such that activity in one part causes reflex activity in another. A common example is the desire to defæcate induced through the gastro-colic reflex on the arrival of food in the stomach, and because of this, in many people the bowels open after breakfast. Sometimes this reflex becomes over active, and an action is produced whenever food is taken. Stools may then be of normal consistency at first, but later fluid. This is called lenteric diarrhœa.

(2) *Irritation of the mucous membrane of the bowel.* This may be mechanical, or by bacterial or chemical poisons. Mechanical irritation may be caused by hard or tough foods such as skins, pips, unripe fruit, fibrous vegetables and meat, particularly if eaten quickly and improperly masticated. The toxins of pathogenic bacteria which infect the mucous membrane of the bowel are a common cause of diarrhœa, as it occurs in many different intestinal infections such as acute gastro-enteritis, typhoid, tuberculous enteritis, and dysentery. Bacterial action on excess residue of starchy foods, protein in the large intestine may cause fermentation or putrefaction respectively and lead indirectly to diarrhœa. Certain chemical poisons, sometimes absorbed from decomposing meat or fish, are a cause, and the too free use of purgatives such as calomel and castor oil in the treatment of constipation may lead to chronic diarrhœa.

(3) *Achlorhydria.* Hydrochloric acid in the stomach softens the connective tissue of meat and the cellulose of fruit and vegetables. It is also a



disinfectant, destroying most of the bacteria which are swallowed with food and so making the upper part of the small intestine relatively free from organisms. In this it is an important barrier not only against microbes swallowed in the food, but against infected material from septic teeth, tonsils, sinuses, and even lung infections. Patients with achylia or complete absence of secretion of hydrochloric acid by the stomach and with achlorhydria and hypochlorhydria secondary to gastritis, often suffer from diarrhœa. This may be lenteric in type, particularly if the meal is indigestible and eaten too quickly. This is due partly to the fact that the normal digestive effect of the hydrochloric acid in softening the food is absent, so that an abnormal amount of food residue passes through into the intestine and causes irritation, and partly to the fact that more pathogenic bacteria can reach the intestine.

Much important knowledge can be obtained from a careful study of stools, and in a patient with diarrhœa this should never be neglected. It is often difficult to tell whether the small intestine, or the large intestine, or both are involved, and this can only be decided in some cases by carefully weighing all the data. Some information may be obtained by giving three charcoal tablets immediately after the bowels have acted and noting how soon after this the stools become black. If this occurs within 12 hours the passage of the intestinal contents is abnormally rapid and if within four hours the small intestine is almost certainly involved.

In fermentative diarrhœa the digestion of starchy foods and cellulose is inadequate, either as a result of excess in the diet or of impaired digestion. Excess of these foods passes down into the large intestine, where fermentation is set up. The stools tend to be

frothy, sour-smelling and acid in reaction. On microscopic examination starch granules may be visible.

In putrefactive diarrhœa the digestion of protein is inadequate, either as the result of dietetic excess or digestive weakness. The stools have a putrid smell, are alkaline in reaction and microscopically show undigested muscle fibre.

When the digestion of fats is impaired the stools are pale or clay coloured and of greatly increased bulk. This may be due to biliary obstruction or pancreatic insufficiency. Bile facilitates the emulsification of fats, and by lowering surface tension helps the absorption, not only of fat but of all foods, so that in its absence the fat in the stools is mainly in the form of split fats. In pancreatic insufficiency or obstruction, in the absence of lipase, the fat is unsplit and appears in the stools in the form of neutral fat. In chylous diarrhœa there is obstruction of the lacteals, so that fatty acids and soaps cannot be absorbed. When this occurs most of the calcium in the diet combines with fatty acid to form soap, which is lost in the stools and as a result calcium deficiency may result.

Stools should also be examined carefully for the presence of undigested food, mucus, blood, pus, sloughs and casts, and the consistency should also be noted.

In treatment it is important to contrast the effects of acute and chronic diarrhœa. In acute diarrhœa with sudden onset and frequent fluid motions, such as is seen in acute gastro-enteritis, cholera, and dysentery, the chief dangers are from toxæmia and dehydration, and the main aim in diet treatment is to combat the latter with fluids and chlorides. Until the acute phase is over glucose may be the only food necessary. In chronic diarrhœa

lasting many weeks or months it is important to give a relatively full diet which contains all the essential food factors so that the patient may gain strength to resist infection. The problem is to give this in a form which does not further irritate the inflamed mucous membrane. It has to be remembered, too, that in chronic diarrhœa absorption is sometimes interfered with, so that a diet that is normal on paper may never reach the patient and may have to be enriched by the addition of certain essentials such as iron or Vitamin B in excess.

*Treatment of diarrhœa by diet: General considerations.* Food should be eaten slowly under conditions of mental and physical rest. Whether bed is necessary depends on severity, but in mild and convalescent cases rest should be insisted on for at least a quarter of an hour before and half an hour after each meal. Chill should be avoided and the abdomen kept warm. No very hot food or drinks should be given and they should preferably be tepid. Smoking should be entirely avoided, as this stimulates bowel activity. Food should be soft and bland and chosen to be easily absorbed and leave no residue to irritate the mucous membrane of the lower bowel.

**Acute diarrhœa:** In severe cases, with very frequent fluid stools, fluid should be given two hourly from 8 a.m. until 10 p.m. and four hourly during the night, if the patient is awake. They should consist of albumen water, whey, glucose lemonade (5 per cent), chicken broth, beef tea, barley water, weak tea and arrowroot made with water. Milk is better avoided until the most acute stage is over. In very severe cases it is best to give water only or half-strength normal saline freely by the mouth, with subcutaneous or intravenous glucose saline (preferably by a drip) if fluid by the mouth only is

insufficient to prevent dehydration. When the acute stage is subsiding the diet may be gradually increased, but the effect of each addition should be carefully watched. Equal parts of milk and water or lime water, Benger's, arrowroot, cornflour junket, custard, ground rice, fruit and milk jellies, thin bread and butter, or toast with the crust removed, lightly boiled or scrambled egg, pounded fish, minced chicken, mashed potato are foods which may be added gradually. Well-diluted fruit juices and Marmite or yeast should also be given for their vitamin content.

After severe infections the importance of sufficiently long rest in bed, to allow complete healing to occur and the excitability of the bowels to subside, must not be forgotten. Patients who are able to take a comparatively full diet while at complete rest often get a recurrence of their diarrhœa if they are allowed up too soon.

Chronic diarrhœa: In chronic diarrhœa the same general considerations also apply, but it is very important to take care that a sufficiently full diet is given. This is sometimes forgotten, and physicians in their zeal for restriction leave their patients half-starved. Patients with diarrhœa which may last for weeks and months require as full a diet as they can take to maintain their strength. In order to help them to resist infection and combat the anæmia which is invariably present, great care should be taken to see that all vitamins are present in adequate amounts, particularly Vitamin B, because this is liable to be deficient in low-residue diets, and that additional iron is given. The latter should be given as an inorganic iron preparation in large doses, and no reliance should be placed on foods reputed to be rich in iron (see "Anæmia").



The diet given must depend on the cause, but in cases due to chronic infection or when there is no special reason to restrict one particular class of foodstuff, the following rules should be followed:

Food should be bland, soft, easily absorbed, and leave no residue.

The following may be allowed:

*Carbohydrates:* White bread (stale), toast, rusks, plain biscuits, refined cereals such as cornflour, rice, sago, semolina puddings, groats, custard, junket, jelly, plain cake, sugar, honey, syrup or barley sugar. Fruit juices and in some cases soft puréed fruit and vegetables in small amounts may be given.

*Proteins:* Boiled or pasteurised milk, lightly boiled or scrambled eggs, pounded fish, tender minced meat or chicken, stewed sweetbreads, brains or tripe, clear soups.

*Fats:* Butter and cream in moderate amounts and only if they agree, boiled or pasteurised milk.

*Drinks:* Weak tea, glucose lemonade or orangeade and barley water.

Meals should be small but frequent and care should be taken to give enough food to maintain strength and increase weight. Food should be given tepid and never very hot or very cold. Meals should be eaten slowly.

The following should be avoided:

*Carbohydrates:* Fruit and vegetables, except as mentioned above, and especially nuts, raisins, and currants, and anything containing pips or skins: Coarse cereal foods, such as brown bread, Ryvita, Vita-wheat, oat-cakes, porridge and pastry.

*Proteins:* Tough or twice cooked meat, fried fish, eggs of meat, and cheese.

*Fats:* These should only be allowed in moderate amounts and should be avoided in cooking.

All rich, highly spiced and flavoured foods, and condiments, except salt, should be avoided.

*Drinks:* Alcohol, strong tea and coffee (see page 64).

The above diet must be altered in certain types of diarrhœa.

In the gastrogenic type, in which achlorhydria the cause, the diet should be as for achlorhydria.

In fermentative diarrhœa, starchy foods should be limited and proteins allowed more freely.

In putrefactive diarrhœa, starches may be allowed and proteins should be restricted.

In fatty or chylous diarrhœa, a restricted-fat or fat-free diet should be given according to the severity of the case and the response to treatment.

It cannot be emphasised too strongly that individual tastes must be considered, and that certain foods mentioned above may be ill-tolerated by certain patients, and must therefore be forbidden.

### COLITIS

Inflammatory conditions of the colon may be limited to one part or involve the whole, and may be due to downward spread of infection from the small intestine. The chief symptom of colitis is diarrhœa, and the ætiological factors which have already been discussed under that heading also apply. The extent to which the small or large intestine are involved depends on many factors, but particularly the type of organism, for some, such as the typhoid bacillus, have a predilection for the small intestine, and others, such as *B. dysenteriae*, for the large. Infective colitis may be acute or chronic, and the dietetic treatment in each is as described under acute and chronic diarrhœa. Chronic colitis may develop into the ulcerative form, and here again the dietetic treatment is as for chronic diarrhœa. Ulcerative colitis is an extremely severe and intractable disease for which there is no specific remedy, but must be combated mainly by raising the patient's powers of resistance. It is therefore doubly important for such patients to be given as full and well-balanced diet as possible, with

vitamins and iron in excess, to guard against deficiencies secondary to failure of absorption. Vitamin B is particularly liable to be deficient in low-residue diets, and this should be remembered.

*Muco-membranous colitis.* Muco-membranous colitis is a condition in which alternating periods of constipation and diarrhœa occur, with the passage of mucous and muco-membranous casts of the bowel. It occurs chiefly in middle-aged women with neurasthenia, and is often associated with other causes of ill-health such as anæmia, bad posture, and visceroptosis. Men are less often affected. It is important to remember that the nervous instability and introspection from which these patients invariably suffer is the most important ætiological factor, and that the intestinal disorder is secondary. In many sufferers the sequence of events giving rise to the condition is probably as follows: The introspective mind is subconsciously alert to focus on and magnify any manifestations of ill-health. In individuals of the type described the most common abdominal symptom is constipation, and this in patients with visceroptosis is likely to cause sensations of abnormal discomfort. Rightly, these should be treated at an early stage by correction of posture, abdominal exercises and if necessary a support for visceroptosis, and alterations to the diet to relieve constipation. These measures, together with treatment of other causes of ill-health such as anæmia, combined with reassurance, should in most cases suffice to prevent further trouble. Treatment, however, is hardly ever started on the above lines, partly because the patient usually starts treating herself by purgation, often unnecessary and very often too drastic. This results in irritation of the mucous membrane of the bowel with an increase in abnormal visceral sensations, and diarrhœa,

often made worse later by secondary infection. The condition then gradually develops in which diarrhœa and the passage of membranous casts alternates with constipation, colonic spasm, and colic. The patient's introspective state of mind keeps pace with her physical degeneration, and her general health deteriorates still further.

**Treatment:** The first essential in treatment is to distract attention from personal symptoms and stimulate outside interests, and this is difficult because such patients usually have few. To achieve this a change of environment is often of great value. Anything which tends to have the reverse effect such as repeated examination of her own stools for mucus or casts, should be discouraged. Colonic lavage should as far as possible be avoided for the same reason, and even excessive dietetic restriction has its dangers. The correction of the patient's mental attitude to her disorder must be the first consideration.

Next in importance is the treatment of any associated disorder such as anæmia, bad posture or visceroptosis. For the latter, physical exercises including breathing exercises and suitable recreation in the fresh air are of great value.

Thirdly come measures for correction of the intestinal symptoms such as constipation and colic, diarrhœa, or alternating periods of each. In this, purgatives and indeed most drugs should be avoided and reliance placed on diet, assisted only by simple medicines when absolutely necessary.

In drawing up a diet the following requirements should be kept in mind:

(1) The diet should be a full one and should contain all essentials. Many patients in their search for relief often cut off one food after another until they are left with a residue which is ill balanced,



insufficient, and lacking in certain essential food factors. On this they lose weight and their general health suffers. Since absorption of food may also be interfered with, even the food they take is not worth its full value to them.

(2) The diet should contain nothing to irritate the bowel, and in most severe cases should consist of a low residue diet similar to that given in chronic diarrhœa.

(3) In cases in which periods of chronic constipation and colic are a feature an attempt should be made to add roughage gradually in a non-irritating form so that the tone of the bowel wall is gradually improved. In doing this liquid paraffin is of great value as a lubricant to prevent irritation, and belladonna to allay intestinal spasm.

In a severe case a strict low-residue diet (see page 64) may be necessary at first, but as the condition improves roughage may be carefully added until a soft anti-constipation diet (see page 50) is well tolerated. In many patients there is anæmia, and in these large doses of iron should be given in the form of medicine. Extra vitamins, and particularly Vitamin B, can often be given with advantage. Smoking tends to increase intestinal spasm, and in the early stages at any rate should be avoided entirely.

It is essential to remember that although diet forms an important part of the treatment of local symptoms it must not be over-emphasised. Treatment of the whole patient comes first, and if dietetic restrictions are made too much of, a state of introspection about diet may result which is very troublesome. This can often be avoided if insistence is laid on general aims, which are carefully explained to the patient, rather than detailed taboos.

## LOW-RESIDUE DIET

*Aims:*

To give a full diet which will leave little residue, after sorption, to irritate the small intestine or colon.

*General instructions:*

(1) Obey the rules for simple dyspepsia, as far as they apply (page 32).

(2) Give extra Vitamin B, as this diet may be deficient in this.

(3) Do not give food very hot or cold.

*Take*

Lemon juice, orange juice, and fruit juices (strained), with sugar and water.

White bread, toast, rusks, plain biscuits (not wholemeal).

Mashed potato.

Refined cereals; ground rice, sago, cornflour, tapioca, groats, arrowroot. Custard, junket.

Plain light steamed puddings.

Fruit jelly, honey, cane sugar, barley sugar, glucose, Marmite.

Tender red meat.

Steamed white fish.

Chicken, bird, brains, sweetbread, tripe, liver, eggs (lightly boiled, poached or scrambled).

Cream cheese.

Milk, pasteurised milk, peptonised milk.

Clear soups, meat or vegetable (strained).

Butter, cream, olive oil.

Weak tea.

*Avoid*

Fruit, vegetables, and salads.

Currants, raisins, figs (fresh or preserved).

Nuts.

Wholemeal or brown bread, wholemeal biscuits.

Coarse cereals. Ryvita.

Tough or twice-cooked meat.

Salmon, sardines, smoked or dried fish. Cheese.

All fried or roasted food.

Oatcakes, porridge.

Alcohol.

## SPECIMEN MENU

*On Rising*

Juice of one orange (strained) in water with sugar.

*Breakfast*

Poached eggs.

Toast and butter (white bread).

Honey or fruit jelly.

Weak tea, milk and sugar.

*Lunch*

Steamed turbot. Mashed potato. Anchovy sauce.

Chocolate cornflour blancmange.

Home-made lemonade (fresh lemon juice).

*Tea*

White bread and butter, toast or rusks.

Honey, fruit jelly or Marmite.

Sponge cake or plain biscuits.

Weak tea, milk and sugar.

*Dinner*

Clear soup.

Fillet of beef. Mashed potato.

Raspberry jelly and custard.

Plain biscuit and butter.

Home-made lemonade or orangeade (fresh lemon or orange juice).

## CARCINOMA OF THE COLON

The duration of life in inoperable carcinoma of the colon is variable but progress is sometimes much slower than is expected. By giving as full a diet as possible much can be done to prolong life and activity and prevent weakness from under-nutrition. Patients should be encouraged to take as full a diet as they are able of the low residue type (see page 64).

## DISEASES OF THE LIVER

Bile is formed continuously by the liver cells and passes by the bile canaliculi and hepatic duct to the gall bladder, where it is concentrated by the absorption of water. The presence of food, particularly fats in the duodenum, causes the immediate discharge of bile from the gall bladder into the duodenum. The functions of bile are by its alkalinity to neutralise the acid chyme from the stomach, by its power of lowering surface tension to facilitate the formation of an emulsion in the intestine so that enzyme action is helped, and by lowering surface tension to aid the absorption not only of fats but of all food. Reabsorption of bile salts stimulates further secretion of bile by the liver. Obstruction at any point in its course, either within the liver or in the hepatic or common ducts, damns back the bile so that it is discharged into the blood-stream, causing jaundice. Without bile, which acts as its co-enzyme, lipase has comparatively little action on fats. Obstructive jaundice therefore causes effects in at least three ways: by toxæmia from the bile absorbed into the blood-stream causing general symptoms like pruritus, depression and bradycardia; by toxic damage to the liver cells themselves; and by its absence from the intestine causing failure of digestion and absorption of fats and to a lesser extent of other foods. Cholesterol is a normal constituent of bile, and under conditions of stasis or infection may lead to the formation of gall-stones in the gall-bladder. These latter are also the chief factors in producing pigment stones. Any factors tending to mechanical stasis, such as insufficient exercise, obesity, passive congestion, or tight lacing, combined with an infective condition of the stomach or duodenum, will tend to produce gall-stones.



In treating obstructive jaundice the aims are three:

(1) To give a diet full enough to maintain strength and resist infection.

(2) To give enough glucose to fill the liver cells with glycogen, because in this condition they are least vulnerable.

(3) To give little fat, so that there is no unnecessary stimulus to liver activity.

These requirements are met by a fat reduced diet containing plenty of glucose and extra vitamin concentrates, particularly Vitamins A and D, which are liable to be deficient. In view of the general interference with digestion and absorption the diet must be light, so as to be easily digested and absorbed.

*Catarrhal jaundice.* In catarrhal jaundice, when there is vomiting or nausea, the diet should consist mainly of fluids: Glucose lemonade, barley water, whey, milk and water, citrated milk (skimmed after standing), chicken broth, and Benger's. Later, toast, fruit jelly, honey, barley sugar, pounded fish, breast of chicken, mashed potato; vegetable purées and milk puddings may be added gradually. Until the jaundice is subsiding the diet should be bland and fats should be limited. They may later be added carefully. Vitamins A and D may be given in the form of Radiostoleum, B in the form of Marmite, and C in fruit juices.

*Cholecystitis.* In patients who have recovered from an attack of cholecystitis, or in whom there is evidence of biliary infection or stasis, certain dietetic measures may be of value in warding off further attacks. Obesity, constipation, reflex hyperchlorydria and gastritis are commonly associated conditions, and the dietetic treatment of these is dealt with under their respective headings. It is

particularly important to treat obesity, which is commonly present, both by a reducing diet which allows little fat, and by physical exercises which include systematic deep breathing and abdominal exercises. Rolleston recommends three-quarters a pint of hot Carlsbad water on an empty stomach twice daily. This should be sipped slowly before breakfast and again in the afternoon while walking gently up and down or practising deep breathing. He also emphasises the importance of taking plenty of water on an empty stomach.

*Gall-stones.* Once formed there is no dietary treatment of gall-stones, but the treatment of associated cholecystitis is on the above lines. Since it has been shown that a high blood cholesterol appears to favour the formation of cholesterol stones, a diet whose cholesterol content is low has been advocated. The chief foods which contain cholesterol are: brains, eggs, cream, butter, fried foods, goose, duck, kidneys, pork, liver, sweetbreads, and peas and beans, and these should therefore be avoided.

#### FAT INTOLERANCE

Fat intolerance is comparatively common in children, and is also met with in adults. Children who suffer from it are of a characteristic mental and physical type. Mentally they are clever, precocious and introspective; physically they often have a clear skin, with fine hair and long eyelashes. Symptoms are varied, but include: loss of appetite, constipation, vomiting, failure to gain weight, wasting, irritability and contrariness (negativism). Sometimes the vomiting is very severe, occurring in cyclical attacks at regular intervals of a few weeks or months. These attacks are preceded by irritability, depression, languor, pallor, loss of appetite.

and constipation. When the vomiting begins it is often prolonged, inducing severe acidosis and dehydration with a smell of acetone in the breath and ketone bodies in the urine. Such patients are often said to suffer from "acidosis", but this is almost certainly secondary to vomiting and the true cause is not understood. From the response to treatment by restriction of fats, it is clear that some abnormality of fat metabolism is present. In some the condition is hereditary, and there is often a family history of migraine or "sick headaches". The parents, like the children, are often clever, highly strung and introspective, and unconsciously create an environment which encourages attacks. Children who suffer from fat intolerance sometimes develop migraine as adults.

To establish the diagnosis many organic diseases such as abdominal tuberculosis or acute obstruction have to be excluded. Recognition of the above chain of symptoms in a child of the type described is the chief diagnostic lead, and confirmation is obtained when the symptoms clear up under treatment.

Treatment by restricting fats and giving carbohydrates, especially plenty of glucose, leads to rapid improvement. In those with cyclical vomiting, attacks often stop at once under this new regimen. In some it is necessary to give a fat-free diet, but usually a considerable reduction in the amount of fat previously given, and additional glucose and sugar, are sufficient to cure. The simplest and most satisfactory method is to give a fat-free diet for a time and, when all symptoms have been controlled, to add fat carefully until a level is found which must not be exceeded. Children with marked nervous symptoms and only children are often the most difficult to cure.

The following is a typical example of fat intolerance:

School boy, aged 9 years.

Family history: Both parents highly intelligent and anxious. Mother subject to sick headaches. One brother, aged 11, subject to bilious attacks.

*History.* Liable to occasional attacks of vomiting and constipation from the age of four. One week before returning to boarding school he began to get occasional attacks of sickness, associated with constipation, pallor and languor, and a pain in the pit of the stomach. These symptoms grew worse during the term, and he was sent home at half-term looking pale and run down, having lost several pounds in weight. He seemed very irritable, contrary and depressed.

*State on examination.* A pale, irritable child with dark rings under his eyes. Round-shouldered, with a slight spinal curvature. Very intelligent (two years below the average age of his class) and introspective about his health. Furred tongue. Slight abdominal tenderness round the umbilicus and fæcal masses in the left iliac fossa. Trace of acetone in the urine.

*Treatment.* He was given a fat-free diet with four ounces of glucose daily, and barley sugar and other sugar *ad lib.*, and daily exercises to improve his posture. On these he rapidly improved, gained weight, and had no further sickness or ill-health. He returned to school. After six months milk and butter were added gradually, but the total fat was kept low.

His brother was also found to be intolerant to fat and was cured of his bilious attacks by the same regimen.

In adults symptoms of fat intolerance are less typical, but often occur. Patients complain of loss of appetite, nausea, vomiting, distaste for fat, epi-



gastric pain or pain and a sense of fullness over the liver, constipation, pallor, migraine, "sick headaches", and depression. During attacks the stools are often pale.

Treatment is on the same lines with a fat-free or fat-restricted diet and extra glucose and sugar (see below).

## FAT REDUCED DIET

### *Aims:*

- (1) To avoid foods containing fat.
- (2) To give excess carbohydrate to make up for the lack of fat.

### *General instructions:*

- (1) Obey the rules for simple dyspepsia (page 32).
- (2) Give concentrates of vitamins A and D, as this diet may be deficient in these.

### *Take*

Cane sugar, glucose, barley sugar, syrup, honey, fruit jelly.  
 Stale bread, toast, rusks, plain biscuits, plain cake.  
 Cereals such as rice, tapioca, sago, ground rice.  
 Porridge.  
 Lean meat, rabbit, tripe, chicken.  
 White fish (boiled or steamed).  
 Meat jelly, clear soups, chicken broth, beef tea.  
 Skimmed milk, skimmed dried milk.  
 Fruit juice.  
 Tender fruit and vegetables.

### *Avoid*

All fat in cooking.  
 All fried foods.  
 Cream, butter, dripping, lard, suet.  
 Olive oil, salad dressing, mayonnaise.  
 Fat meats, such as bacon, pork, tongue, sausages, liver, fat of any meat.  
 Milk, except skimmed.  
 Salmon, sardines, eggs, cheese, pastry, rich cakes.  
 Cocoa, chocolate, nuts.  
 Cod and halibut liver oil.

## SPECIMEN MENU

*Breakfast*

Half a grapefruit with sugar.  
Puffed rice with sugar or syrup.  
Lean ham.  
Toast with honey or fruit jelly.  
Weak tea or coffee with skimmed milk and sugar.

*Mid-morning*

Chicken broth with slice of stale bread or toast.

*Lunch*

Boiled chicken or white fish.  
Potatoes. Spring carrots or green vegetables.  
Sago mould flavoured with fruit syrup.  
Home-made lemonade.

*Tea*

Rusks or toast with apple jelly or honey.  
Cornflour cake.  
Weak tea with slices of lemon; sugar if desired.

*Dinner*

Clear beef soup.  
Steamed turbot. Young cabbage. Mashed potato.  
Baked apple with sugar.  
Blancmange (made with skimmed milk).  
Sweet orangeade.

## PART II





## PART II



### CHAPTER FIVE

## GENITO-URINARY DISORDERS

### ALBUMINURIA

ALBUMINURIA is frequently found in adolescents and young adults who seem perfectly healthy and show no signs of renal or other disease. This is prone to occur in patients who are growing rapidly, and is often found in those with bad posture, anæmia, and vaso-motor instability. In such patients the urine passed immediately on rising in the morning is normal, but that passed at midday or in the evening after walking about contains albumin, and the amount is increased after more strenuous exercise. This condition is called functional or orthostatic albuminuria, and in distinguishing it from that caused by nephritis and other more serious diseases, the three-specimen test is of great value. Three specimens of urine are tested, the first passed on rising in the morning, the second at midday and the third in the evening. In the functional type the early morning specimen is free from albumin, but it is present in varying amounts in the other two. In addition to this test a microscopic examination of the urine should always be made to exclude casts, blood cells or other signs of renal disease, and a careful general examination made to exclude other possible organic causes. From the point of view of treatment by diet it is important not to confuse this benign condition with nephritis, because functional albuminuria does not require any dietetic restriction. Patients in whom it is present usually need a full well-balanced diet containing plenty of animal protein and vitamins.

## DISEASES OF THE KIDNEY

*Normal renal function.* The healthy kidney, by regulating the excretion of water and solids, has three important effects:

(1) It keeps the reaction of the body fluids within normal limits.

(2) It regulates the amount of fluid in the body and maintains a normal salt concentration.

(3) It excretes certain waste products.

These activities are extremely complex, and the mechanism by which they are accomplished is not fully understood. It is clear, however, that the glomeruli, by a process of filtration, form a fluid identical in composition with blood-plasma minus proteins, and that this is modified during its passage down the renal tubules according to the needs of the body. This latter process is an active one, involving increased activity of the cells lining the renal tubules and increased consumption of oxygen by the kidney.

The different structures in the kidney are so closely interwoven that pathological changes are unlikely to remain strictly confined anatomically, and disturbances of function are correspondingly mixed. Treatment has therefore to be based, not on exact knowledge of the part of the organ involved, but on the main functional derangement revealed by biochemical and pathological tests and the clinical condition and progress of the patient. In treating renal disease by diet an attempt is made to relieve the organ of all unnecessary strain and at the same time to give a diet which is sufficient both for recovery and as high a standard of general health as possible. There is a danger that in attempting to save the kidney the needs of the patient may be forgotten. In acute renal disease a very restricted

diet may be given for a period of days or even weeks without affecting the patient's general health. In chronic renal disease, on the other hand, while it is very desirable to throw as little work on the kidney as possible, this must not be done at the expense of the general health, and great care must be taken to find the best compromise. If this is forgotten a patient with mild renal damage may be kept on a very restricted diet for a long time, so that his health suffers more from the diet than the disease. In treating any case of renal disease by diet it is well to ask: "Are these restrictions worth while?" In some cases the only way of answering this question is by trying a fuller diet for a time. The feelings of the patient are in some cases a better guide than the findings in the urine.

In attempting to divide nephritis into different types it must be remembered that pathological and clinical types cannot be sharply differentiated, but that they merge into each other, so that many mixed forms which are difficult to classify are met with. It follows that treatment may be correspondingly difficult to choose. In the same way classification into acute, sub-acute, and chronic forms is arbitrary, but for convenience those which have cleared up at the end of two months may be regarded as acute; those which persist for a further four months as sub-acute; and those which persist longer than six months as chronic. An acute exacerbation may, however, occur during the course of chronic nephritis.

*Acute nephritis.* Focal glomerulo-nephritis: This type is particularly liable to occur in children after streptococcal infections of the nose or throat, and its initial characteristic symptom is hæmaturia. Constitutional symptoms are often slight; there is no œdema, and the urine only contains a small

amount of albumin, and few casts. Renal efficiency tests show no evidence of impaired function. The blood urea is normal. In this condition it is probable that only a few glomeruli are involved, and it usually clears up completely.

*Diet:* The patient should be kept in bed and for the first week a very restricted diet should be given. Three pints of fluid should be allowed per day, given in form of glucose lemonade or orangeade (glucose 5 ozs., juice of two oranges or one lemon and water to one pint), barley water with glucose, milk and water or soda-water in equal parts, or chicken broth. If urine is being passed freely more fluids may be allowed. No solids should be allowed, but barley sugar or toffee may be sucked. During the second week, whole milk up to one pint, toast, rusks, thin bread and butter, with honey, Marmite or fruit jelly, farinaceous foods, cereals and cream may be added gradually, and subsequently more milk, eggs, pounded fish, chicken, fruit and vegetables. Three weeks after the hæmaturia has ceased a full bland diet may be allowed, but red meat should only be given in small amounts and not more than once daily for the next month. The length of time and degree of restriction of the diet depend on the severity and persistence of the hæmaturia, but in most cases a normal diet may be allowed two months after the onset, and in mild cases sooner.

*Acute diffuse glomerulo-nephritis.* This is a more severe type, characterised clinically by headache, vomiting, pain in the loins, œdema and general toxæmia and the presence of albumin, blood, and casts in the urine. There may be suppression of urine, convulsions, eye symptoms with retinal changes, and raised blood-pressure. The blood urea may be raised. In this type the excretion of



water, salts and nitrogenous substances may all be impaired. The condition may subside completely or become chronic.

*Diet:* This should aim at complete rest for the kidney during the first seven days, and for a longer period if progress is not satisfactory. Only water, glucose and fruit juices should be given, and the amount of fluid should be restricted according to the amount of urine passed. If there is a tendency to suppression the total amount should be reduced to one pint daily, provided that the patient does not complain of thirst. The actual amount given must be regulated according to the amount of sweating, and if this is considerable, as in hot weather, more should be given but only sufficient to keep the patient comfortable. When diuresis occurs the fluid ration may be increased, but while there is œdema it should be kept on the low side. Milk should not be given in the early stages because it contains a considerable amount of protein (20 grm. in one pint). When the symptoms, signs, urinary findings, and renal function tests indicate that the inflammation is subsiding, the diet may be increased gradually on the lines described for acute focal nephritis. Additions, however, should be made more slowly, and red meat should usually not be allowed until the urine has been normal for at least one month. While there is œdema no salt should be used in cooking and no additional salt taken with the food.

*Sub-acute and chronic nephritis.* From the point of view of treatment by diet these cases may be divided into those in which loss of proteins from the plasma upsets the osmotic balance between the blood and the tissue fluids and causes œdema; those in which failure to excrete salts and water causes œdema; and those in which failure to excrete

nitrogenous waste products leads to their accumulation in the blood.

*Sub-acute nephritis with salt retention and œdema*  
This may occur as a sequel to acute nephritis or superimposed on a chronic nephritis. The blood pressure tends to be raised and the heart enlarged and there may be retinal changes. The urine is reduced in amount, with normal or slightly low specific gravity and a moderate amount of albumin. The chlorides are reduced, and there may be a few red cells, leucocytes, and blood and granular casts. The blood urea is often raised and the blood cholesterol normal. The urea concentration test gives low values.

In this type of case a salt-poor diet may be tried. No salt must be used in cooking or added afterwards. A low-salt diet consists of half a pint of milk (0.15 per cent NaCl), fresh fish steamed or boiled, fresh meat boiled or stewed in plenty of water, one egg (0.28 per cent NaCl), salt-free bread, butter, honey, cream, sugar, jam, fruit jelly, fresh fruit and vegetable. All salted foods, roasted or fried fish or meat, tinned foods or preserved vegetables should be avoided.

In cases that appear to be suitable a low-salt diet may be tried for a few weeks, but it should only be continued if the result is satisfactory as judged by the degree of œdema and the feelings of the patient.

*Lipoid nephrosis (œdema present).* This is usually secondary to acute nephritis, and œdema is due to loss of proteins from the plasma, which lowers the osmotic pressure of the plasma proteins and so allows the fluids to pass more easily into the tissue spaces.

The blood-pressure is not raised, the heart is normal in size, and there are no retinal changes.

The urine is reduced in amount with a raised specific gravity and much albumin, and contains granular and fatty casts and a few leucocytes. The chlorides are reduced. The protein in the plasma is reduced, the blood urea normal, and the blood cholesterol very much raised. The urea concentration test is normal.

For this type Epstein recommended a high-protein diet with reduced fat. Lean meat and fish may be given three times a day with skimmed milk, fruit, vegetables, cereals and sugar in moderation. Fat meat, cream, butter, olive oil and other fats are avoided (see Diet Sheet, page 85). This diet should not be given if there is nitrogen retention.

*Chronic interstitial nephritis* (no œdema). This may occur as a sequel to acute nephritis, or develop insidiously. The symptoms are mainly those of raised blood-pressure and myocardial weakness. The blood-pressure tends to be very high, the heart enlarged, and retinal changes are often present. The urine is increased in amount and of low specific gravity with a slight trace of albumin. The chlorides are normal, and a few granular casts and leucocytes may be present. The blood urea is raised, often very high, and the urea concentration test gives low values.

This type of nephritis is usually progressive, with a rising blood-pressure and blood urea, and death from uræmia, cerebral hæmorrhage, cardiac failure or intercurrent disease. It is important to remember that treatment by diet can do little to influence the course of the disease, and that it can only aim at reducing the work of the kidney, liver and cardiovascular system to a minimum, preventing nitrogen retention and at the same time providing sufficient food and vitamins for limited activity and resistance

to intercurrent infection. In practice this is best attained by a bland diet with plenty of fluids and vitamins (often conveniently given as concentrates) and no red meat or meat extracts. In view of the cardiac symptoms which are often present, meals should be small in bulk and taken dry with fluids in between. Some patients feel better with small amounts of red meat daily, and to these it may be allowed. Appetite is a good guide to the amount of food allowed, and drastic restrictions may do more harm than good.

*Arterio-sclerotic kidney.* This tends to occur in patients over fifty, and comes on insidiously. The degenerative changes in the kidney are secondary to arterial changes, and are part of a general arterial degeneration involving different parts of the cardiovascular system to a greater or lesser degree. The symptoms are those of arterio-sclerosis, high blood-pressure or myocardial weakness. The blood-pressure is raised, the heart is enlarged, and there are arterio-sclerotic changes in the retina. The urine is increased in amount with a low specific gravity and a small amount of albumin. A few granular and hyaline casts may be present. The blood urea is often raised, certainly when the disease is advanced, and the urea concentration test may show slight impairment. The condition may be only slightly progressive and may remain stationary for a number of years. Death is usually due to cardiac failure or cerebral thrombosis, or a terminal uræmia may occur as a result of circulatory failure.

The changes in the kidney are relatively unimportant and do not call for special treatment apart from that of the general condition. There is a danger that they may be over-emphasised and treated by more drastic dietetic restrictions than



are necessary. The general condition calls for a regular disciplined life with mental and physical activities compatible with the severity of the symptoms and signs. Alcohol and smoking are forbidden, or allowed only in great moderation. Food should be plain and nourishing and contain all the essentials of a normal diet. Protein should be allowed in moderate amounts, but should not usually exceed 60 grm. daily. If there is nitrogen retention as shown by a raised blood urea, red meat may be forbidden entirely, but only provided that the patient does not feel worse without it. The aim of diet treatment should be to guard against over-eating and to reduce weight in all but the very thin. Too vigorous "treatment" of the albuminuria by diet often leads to a state of weakness which is more serious than the disease, and may shorten rather than prolong life.

The above classification of nephritis is arbitrary, and many cases are mixed and do not fit into any one category. In such, the choice of treatment must depend on the particular function which is most impaired, and often the only way to find out if a particular diet is useful is to try it. This is particularly so in general practice when bio-chemical investigations are necessarily limited.

### SALT REDUCED DIET

(For nephritis with œdema.)

#### *Aims:*

To reduce the amount of sodium chloride in the body fluids so that œdema is diminished.

#### *General instructions:*

No salt must be used in cooking or added afterwards.

<i>Take</i>	<i>Avoid</i>
Half pint of milk.	All salted foods.
Steamed or boiled fish.	Fish or meat (roasted or fried).
Meat, boiled or stewed in plenty of water.	Tinned or preserved foods.
One egg.	Sausages.
Salt-free bread.	
Salt-free butter.	
Cream.	
Honey.	
Sugar.	
Jam.	
Fruit jelly.	
Fresh fruit.	
Fresh green vegetables (boiled or steamed).	
Potatoes, boiled or baked in jackets.	
Root vegetables braised in salt-free butter.	

## SPECIMEN MENU

### *Breakfast*

Apple or orange.  
 Boiled egg.  
 Toast or bread (salt free).  
 Butter (salt free), marmalade or honey.  
 Tea or coffee with little milk (3 ozs.) and sugar.

### *Dinner*

Steamed white fish. Spring cabbage. Boiled potato.  
 Fresh fruit and cream.  
 Home-made lemonade (fresh lemon juice).

### *Tea*

Tea with little milk (3 ozs.) and sugar.  
 Bread (salt free), butter (salt free).  
 Honey or fruit jelly.

### *Supper*

Stewed steak. Boiled cabbage and potatoes.  
 Stewed apples and cream.  
 Toast (salt-free bread).

## HIGH PROTEIN AND LOW FAT DIET

(For lipoid nephrosis with œdema.)

*Aims:*

To give 150 to 200 grm. of protein daily with very little fat.

*General instructions:*

To take this large amount of protein, give lean meat or fish three times a day.

Give concentrates of Vitamins A and D to make up for possible deficiency.

*Take**Avoid*

Lean beef, mutton, ham, chicken, pheasant, rabbit.

White fish, sweetbreads, tripe, oysters, meat jelly.

Bread, oatmeal, rice and other cereals.

Peas, beans.

Skimmed milk.

In strict moderation — sugar, fruit, and other vegetables.

Skimmed milk . 1½ pts.

Meat . 8 oz.

Bread . 6 oz.

Fish . 4 oz.

All fried foods.

All fat in cooking.

Roast meat.

Butter, margarine, cream, olive oil.

Bacon, fat meat, suet, lard, dripping.

Cod and halibut liver oil.

Eggs.

Milk, except skimmed.

Cheese.

Supply approximately 150 grm. of protein.

## SPECIMEN MENU

*Breakfast*

Half a grapefruit with sugar.

Steamed hake (4 oz.).

Toast (1½ oz.) with jam, marmalade, honey or Marmite.

Tea or coffee with skimmed milk (¼ pint).

*Mid-morning*

Half pint skimmed milk flavoured with coffee.

*Lunch*

Stewed lean mutton (4 oz.) with rice.

Brown bread (2 oz.), one carrot.

Sago pudding, one stewed pear. Skimmed milk (¼ pint).

*Tea*

Toast (1½ oz.) with jam, honey or Marmite.

Tea with skimmed milk (¼ pint).

*Dinner*

Boiled beef (4 oz.). Green peas. Potatoes.

Toast (1 oz.).

Fruit jelly.

Coffee with skimmed milk (¼ pint).

## INFECTIONS IN THE URINARY TRACT

In treating urinary infections the most important dietetic consideration is how much fluid to give. In some, such as acute pyelitis due to *Bacillus coli*, or acute gonococcal urethritis, large amounts must be given to wash away inflammatory products. When urinary antiseptics are used a reduced urinary flow is needed, so the amount of fluid given is limited so that they may act in a high concentration.

The reaction of urine may be affected by diet. The normal reaction on a mixed diet is acid, and this is chiefly due to the presence of acid sodium phosphate. Phosphoric acid formed by the oxidation of phosphorus contained in protein is excreted as such, and urine on a high protein diet may be strongly acid. Vegetable foods contain organic salts such as citrates and tartrates of potassium and sodium in abundance, and while the organic acids are completely oxidised the bases are excreted in the urine, making it alkaline. Although reaction is an important consideration in the treatment of urinary infections, in practice the reaction is altered by giving acid sodium phosphate, ammonium chloride, potassium citrate or sodium bicarbonate as required, rather than by attempting to regulate



it by diet. It should be remembered that a high protein diet will normally give an acid, and a vegetarian diet an alkaline urine.

In acute infections of the urinary tract the diet should be light, for no harm is caused by little food for a short period.

In chronic infections, on the other hand, a full balanced diet should be given to maintain strength and raise resistance to infection. Food should be plain, and excess of protein, particularly red meat, avoided.

The treatment of urinary infections has afforded an interesting example of a specific bactericidal effect induced by a special diet. It was found that *B. coli* infections were vulnerable to aceto-acetic and b-oxybutyric acid in the urine, so that by giving a ketogenic diet patients could be cured. A ketogenic diet is one in which the ratio of carbohydrate to fat is so low that fat metabolism is incomplete, and unoxidised products, aceto-acetic acid and b-oxybutyric acid circulate in the blood and are excreted in the urine. This treatment was found to be very useful in children, in whom a ketosis is induced with comparative ease. It was also useful in adults, but more difficult to apply owing to the greater difficulty in producing a sufficient degree of ketosis. To be successful, such a large amount of fat with so little carbohydrate had to be given that the diet was too nauseating for many patients. This treatment has now been entirely superseded by mandelic acid, and more recently still by sulphonamide, both of which are easy to take and more effective.

*Acute pyelitis.* Most cases are due to *B. coli*. During the acute stages while there is fever and pain the urine is kept alkaline by large doses of potassium citrate. The diet should be mainly fluid and should consist of milk, and water or soda water,

glucose lemonade, barley water, chicken broth, very weak China tea, and plain water. Toast or rusks, with butter, honey or fruit jelly may also be given. The patient should be encouraged to drink six pints of fluid in the 24 hours, and this can best be done if a large jug of water or dilute lemonade is kept by the bedside and he is encouraged to drink at regular intervals. A mineral water such as Vittel, Contrexeville or Vichy is sometimes taken better than ordinary water, and is useful. Many patients will not take such large amounts of water unless they are supervised. If, however, enthusiasm can be roused by explaining that the object of drinking such a lot is to wash away the infection, there is often no further difficulty.

When the acute phase has subsided urinary anti-septics such as urotropin and mandelic acid are used, and since these act best in a concentrated acid urine the amount of fluid in the diet must be reduced. The correct degree of acidity is obtained by giving acid sodium phosphate or ammonium chloride by the mouth. The daily intake of fluid may be reduced to two or one and a half pints, care being taken that too much urinary irritation is not produced. Reduction of fluid should never be so severe that thirst is troublesome, and it must be remembered that in very hot weather or with patients who perspire a great deal larger amounts of fluid are necessary.

With sulphonamide preparations, especially sulphadiazine, plenty of fluid should be given in order to prevent the deposition of crystals in the kidney. This is particularly important in very hot weather or with profuse sweating.

As the temperature and symptoms subside the diet may be gradually increased by the addition of

fish, chicken, eggs; fresh fruits such as apples, pears, oranges, grapefruit, melon and peaches; and vegetables such as potato, cauliflower, marrow, cabbage, and lettuce. Meat should be added last, at first only in small amounts and only freely when the infection has quite cleared up. During the whole course of the disease all condiments, spices, highly flavoured and seasoned foods should be avoided and no alcohol allowed.

*Acute cystitis and urethritis.* In these conditions dietetic treatment is the same as in acute pyelitis. In acute urethritis the gonococcus is the commonest cause, and in this infection it is extremely important for all alcohol to be avoided.

*Chronic pyelitis, cystitis and bacilluria.* In these conditions the same diet is given as in the later stages of acute pyelitis, with the difference that it should be fuller. It should be full and plain, and rich in all vitamins, with red meat not more than once daily. Particular attention should be paid to the amount of fluid given according to whether alkalies or urinary antiseptics are being used. In tuberculous cases the maintenance of weight and strength by as full a diet as possible is one of the most important adjuncts to surgical treatment.

## RENAL AND VESICAL CALCULUS

When a stone has formed in the kidney or bladder and causes symptoms, treatment must usually be surgical. In patients from whom a stone has been removed or in whom the passage of gravel gives warning of the danger of calculus formation, certain dietetic precautions may be of value.

The factors leading to calculus formation are:  
(1) A concentrated urine; (2) the passage of crystals;

and (3) some colloidal material to bind them together. Infection usually provides the latter. Calcium oxalate most commonly forms the nucleus of a calculus, and patients who suffer from oxaluria should be warned to drink plenty of water and to avoid foods which are rich in oxalates, such as rhubarb, spinach, strawberries, and chocolate.

Uric acid tends to be excreted in highly acid urine, and those who show this tendency should avoid large amounts of meat and purines (see Gout, page 120).

The most important way of preventing calculus formation is to make patients drink more water. Many people do not drink enough, and this can be remedied by insisting on one or two tumblers of water on rising in the morning, more water between meals, and a glass of water at bedtime.



CHAPTER SIX

METABOLIC DISORDERS

OVER-NUTRITION AND OBESITY

OBESITY in its minor or major forms is commonly met with in general practice, and needs treatment by diet. Treatment for the condition itself is important, but these form only a minority of the cases. There are many disorders which occur in direct or casual association with over-nutrition and can be completely or partly relieved by a reducing diet. The prevention of over-nutrition, too, is one of the most effective prophylactic measures against the degenerative processes of later life.

To make this clear, consider first the possible effects of an abnormal gain in weight on the body as a whole. The addition of a stone means that more work has to be done, and this throws extra strain on the circulatory and respiratory systems for which there is no return. To those of sedentary occupation or inclination this may tip the scales on the side of increasing weight and decreasing activity, and this vicious circle once started may be difficult to break. Deposits of superfluous fat around the hip and shoulder girdles and in the abdomen produce a bad posture, which leads to incorrect breathing and visceroptosis. Incorrect breathing, with poor use of the bases of the lungs, a flabby abdominal wall, and diminished activity pre-dispose to respiratory infections and interfere with the return of blood to the heart. This is normally brought about by the muscular movements of the limbs, the descent of the diaphragm during inspiration—which with an abdominal wall of good tone raises the intra-

abdominal pressure and drives blood towards the heart—and the negative pressure in the great veins towards the end of inspiration.

Venous stasis produced in this way causes congestion of the intestines and liver, with symptoms of indigestion and hæmorrhoids. Further, the output of the heart is dependent on the venous return, so that the whole circulation suffers. Increased deposit of fat and diminished activity also have secondary effects on joints, fasciæ and tendon sheaths, allowing adhesions to form which further interfere with mobility and impair blood supply, and these in turn predispose to chronic infections such as fibrositis, sciatica and chronic rheumatism. In these latter conditions the mechanical effects of increased weight increase the disability caused by chronic rheumatic infections and diseased joints, and its treatment may be an important step in the direction of cure. Increase in weight often runs parallel with an increase in blood-pressure, which may be brought down when the weight is reduced, and it is often associated with diabetes and gout (see pages 110 and 120).

The effect of obesity on the heart is very important and may produce relative cardiac insufficiency. This has been investigated by Proger and Dennig<sup>1</sup>, who in an experimental study, compared three normal with three obese patients. They found that the vital capacity in the obese was from 12 to 25 per cent below normal according to whether height or surface area standards were used. The respiratory minute volume, while the same in both groups at rest, showed an average increase of one third in the obese during mild exercise. The respiratory rate per minute in the normal and obese during mild

<sup>1</sup> Proger, S. H., and Dennig, H., *Journ. Clin. Invest.*, 1932, xi. 789.

exercise was 17 and 28 respectively. The oxygen consumption was definitely greater in the obese during exercise and was more than could be accounted for by the greater work associated with the extra weight or the higher respiratory rates. The resting pulse-rate tended to be higher in the obese. If obesity produces these effects in patients with healthy hearts, its deleterious effect on a damaged heart with diminished reserve is clear.

The above facts show what an important part increasing weight may play in producing and accentuating the evil effects of many very different conditions. From the point of view of treatment it is often the most important link in a chain of events leading to illness—most important because it can in many cases be successfully treated if not left too late.

*Causes of obesity.* Du Bois<sup>1</sup> has divided cases into two main groups: (1) Endogenous or constitutional, in which there is frank endocrine abnormality; and (2) exogenous, in which no such cause can be recognised. While many patients fall clearly into one of these groups, there are others in which it is impossible to be sure of the ætiological factors or know whether there is an endocrine disturbance or not. Different people vary greatly in their tendency to put on weight. Some can eat as much as they like and take very little exercise without gaining weight, while others have but to eat a little extra bread or sugar or omit their morning walk to gain rapidly. Such differences often run in families, and may be likened to other hereditary disorders, such as diabetes or gout. For this reason a careful family history sometimes gives an indication as to prognosis, for those who come of obese stock are

<sup>1</sup> Du Bois, E. F., "Basal Metabolism in Health and Disease," p. 238. London. 1927.

often more difficult to treat than others. Of the endocrine disorders causing obesity, thyroid and pituitary deficiency are the most common, but other deficiencies sometimes have the same effect. Whatever may be the underlying cause, it is certain that in the majority of patients gain or loss depends on supply and demand, the amount of food absorbed and the amount of energy used. The effects produced by varying diet and activity are regulated by secretions of ductless glands and other factors, and this partly explains why people respond so differently. It is impossible to predict with certainty the effect of a particular regimen on a patient, and this must often be determined by trial and error. In most patients, however, decrease in fat-forming foods and increase in exercise will cause a loss of weight, and treatment on these lines should be tried first.

*Methods of reducing weight.* In trying to reduce weight diet must be decreased and activity increased, and in doing this it is important for both changes to be made gradually. The extent of each should be judged by two indicators: (1) the feelings of the patient; and (2) the weight of the patient. If the diet is reduced too suddenly the patient is likely to feel weak and empty and unable to be even as active as he has been in the past. This may so discourage him at the start that he may abandon treatment, and even if he persists, the sudden adjustment to a much lower diet may cause considerable discomfort which can be avoided with a more gradual change. The same applies to increased activity, especially when it is combined with a reduced diet. In fat people who have been unaccustomed to exercise the myocardium is often flabby, and extra work should be thrown on this gradually. In making changes the base line must always be the diet and



exercise which the patient has been used to up to the time of coming under treatment. This must first be carefully considered and the patient weighed. Instructions are then given for the reduction of carbohydrate and fat in small amounts at first at weekly intervals, the patient being weighed every week. At the same time his exercise is gradually increased, care being taken that symptoms are avoided. When a diet has been reached which causes a steady fall of one to two pounds a week it may be continued or reduced further according to the feelings of the patient. Once this effect is obtained, further extreme reduction is unnecessary, and as the weight comes down and the state of training improves it will be easier to increase exercise. Carbohydrate and fat are the foods which are stored as fat in the body, and it is these that should be reduced. This means that the diet must consist mainly of lean meat, fruit and green vegetables with only enough sugar, starch and fat to prevent feelings of weakness or hunger. There is less need to restrict protein because fat is not formed from protein to any extent and its stimulating effect on metabolism is beneficial. If, therefore, patients are inclined to feel weak on a reduced diet they may be given a larger amount of protein without fear of putting on weight.

The following example<sup>1</sup> shows this method in practice:

A woman, aged 50, with obesity. Weight 14 st. 6 lb. No evidence of endocrine abnormality.

On July 3 1937 she was put on a diet of lean meat, fruit and green vegetables with 140 grm. carbohydrate per day. By July 31 there had been no change in weight, and so the carbohydrate was

<sup>1</sup> Reported previously. Cole, L., *Brit. Med. Journ.*, 1938, i, 157.

reduced to 80 grm. On August 14 her weight was still 14 st. 5 lb., so the carbohydrate was further reduced, to 60 grm. On October 16 her weight had fallen to 13 st. 4 lb.

Increase in exercise should be gradual, especially at the beginning of treatment, and in severe cases massage is very useful. Physical exercises designed to improve breathing and posture should be taught and supervised by a qualified masseuse until proficiency is attained, after which supervision may be relaxed and the patient encouraged to continue regularly on her own. If the abdomen is lax and prominent an abdominal belt is often of value in facilitating movement and balance and contributing indirectly to increased activity. To walk a prescribed and gradually lengthening distance every day is a good method of ordering exercise, but golf, cycling, riding, swimming and tennis are all useful if they are suited to the patient.

Treatment on these lines is successful in most patients who are keen to co-operate. Without the sincere help of the patient, however, it is difficult to get good results, and even after temporary success relapse is likely to follow if the patient allows himself to drift back into his old habits. Failures most commonly occur in those with a strong familial tendency to obesity. It must be strongly impressed on the patient that a reduction of weight obtained on the above lines can only be maintained if he is careful to persevere in a more abstemious and active life.

*Use of thyroid extract.* If treatment by diet and exercise fails the use of thyroid extract must be considered, and because this is so intimately bound up with the question of diet and metabolism it will be briefly discussed here. The effect of thyroid extract is to stimulate metabolism so that there is

increased tissue breakdown and increased oxygen consumption. Except in cases of hypothyroidism or myxædema, thyroid should only be used as an adjunct to treatment by diet and exercise. Treatment of obesity by thyroid extract alone is usually unsuccessful, unless the dose is pushed, and then it may be dangerous. Poulton<sup>1</sup> suggests that many obese subjects, far from having a low metabolism, have it slightly raised. To give it under such conditions, without reducing weight, may mean that more work is thrown on a heart which already has too much to do, and the patient remains fat and feels more ill.

*Obesity associated with other diseases.* Enough has already been said on the general effects of obesity and over nutrition to show that these should be treated not only for themselves but for the indirect relief that may be obtained in many other secondary and associated conditions. Of these the chief are: threatened cardiac failure and all cases of cardiac disease who are over weight, arteriosclerosis with or without hypertension, chronic nephritis, chronic bronchitis, chronic rheumatic infections, arthritis, gout, and diabetes mellitus. Obesity in such conditions should be treated on the same lines, but much greater care must be taken than with patients who are otherwise healthy. In cardiac cases increased exercise must be carefully adjusted to the state of the heart, and supervision should be closer.

In general practice opportunities often arise of preventing an increase in weight at a very early stage by timely advice on diet and exercise, and these should never be lost, especially in patients who have a tendency to cardio vascular or other disease. To treat a patient for over-nutrition when he con-

<sup>1</sup> Poulton, E. P., *Proc. Roy. Soc. Med.*, 1931, xxv, 347.

sults you about a cold is a good example of the art of scientific medicine—but it may need tact!

## REDUCING DIET FOR OBESITY

### *Aims:*

- (1) To limit fat-forming foods: sugar, starch and fats.
- (2) To prevent hunger by providing bulk in the form of fruit and vegetables.
- (3) To reduce fluids.
- (4) To make changes gradually so that symptoms of hunger or weakness are avoided.

### *Take*

Fruit, green vegetables, tomatoes, lean meat, chicken, fish, egg (one or two daily), skimmed milk, toast, Ryvita, bread, clear soups, meat extracts, tea, coffee, dry sherry, whisky (well diluted), saccharine.

Toast, Ryvita and bread should be reduced gradually until a satisfactory fall in weight is obtained.

Concentrates of Vitamins A and D should be given to avoid deficiency.

### *Avoid*

Butter, cream, fat meat, dripping, olive oil, fried foods, fat in cooking, suet, sugar, sweets, sweet food of all kinds, flour, pastry, cakes, sweet biscuits, thick soups and gravies, potatoes, rice and other cereals, peas, beans, chocolate, cocoa, beetroot, carrots, parsnips, beer, stout, sweet wines.

## SPECIMEN MENU

### *On Rising*

Glass of hot lemon juice and water (with saccharine if required).

### *Breakfast*

One egg, boiled, poached or scrambled with little butter, or lean ham (small helping).

Brown bread toast or Ryvita.

Marmite, thin scrape of butter, jam or marmalade.

Fresh fruit, such as orange, apple, grapefruit.

Tea or coffee, skimmed milk, saccharine or slice of lemon.



*Lunch or Dinner*

Clear soup. Lean meat.  
Green vegetables or salad. Ryvita or toast.  
Stewed or raw fruit.  
Plain biscuit. Marmite.

*Tea*

Tea, skimmed milk, saccharine.  
Bread or toast with scraping of butter, honey, Marmite,  
or jam. Salad or fruit.

*Dinner or Supper*

Clear soup. White fish, chicken or one egg.  
Green vegetables or salad. Toast or Ryvita.  
Fruit or plain biscuit with Marmite or scraping of butter.

## GLYCOSURIA AND DIABETES MELLITUS

The differential diagnosis of glycosuria:

Glycosuria may be harmless or dangerous, according to its cause. As an isolated sign it should never be treated until its nature has been proved. Some cases are due to true diabetes mellitus and need careful treatment, and others to causes such as a simple renal leak of sugar, which can be ignored. Mistakes in dietetic treatment are mainly due either to failure to distinguish between these two, or failure to assess the severity and type of diabetes when this is the cause. They are often made when treatment is started before an exact diagnosis has been established, with the result that an innocent glycosuria is treated by unnecessary restriction, or a mild case of diabetes by too drastic a diet.

*Physiology.* Normally, glucose absorbed from the intestine is carried by the portal system to the liver, where it is stored as glycogen. The storage mechanism when acting efficiently does not allow the level of glucose in the blood to rise above 0.18 per cent.

After a carbohydrate meal it rises from its resting level of 0.08 per cent to 0.12 per cent, to 0.18 per cent at the end of one hour. Glucose is then rapidly stored, and the level falls again, reaching the normal resting level or a little lower at the end of one and a half to two hours. The glycogen stores in the muscles are replenished from the blood sugar and an excessive fall is prevented by mobilisation of glycogen from the liver. Insulin is necessary both for oxidation of glucose and for its conversion to glycogen, and when it is inactive or insufficient the blood sugar rises. The level at which the kidney allows glucose to leak through is 0.18 per cent, and this is called the renal threshold. Normally, glucose does not appear in the urine because the storage mechanism does not allow the blood sugar to rise above the level of the renal threshold. Glycosuria can only occur when for some reason the blood-sugar rises above 0.18 per cent or when the kidney allows sugar to pass through at a lower level than the normal threshold of 0.18 per cent.

Glycosuria due to a low renal threshold:

A renal threshold of 0.14 per cent is not uncommon in otherwise normal people, and when this is present glycosuria occurs after every carbohydrate meal. The condition may be hereditary, does not appear to be harmful or progressive, and usually causes no symptoms. It is very important for its true nature to be recognised, and this requires a sugar tolerance curve.

Glycosuria due to a raised blood-sugar:

A blood-sugar above 0.18 per cent may be due to failure to store or oxidise sugar, and may be produced in various ways:

(1) Adrenalin mobilises glycogen as glucose so that the blood-sugar rises above the normal level and causes glycosuria. A severe shock or chronic

worry may both, by this mechanism, cause glycosuria.

(2) Hyperthyroidism or thyroid feeding have the same effect and cause glycosuria. This is a comparatively common finding in Graves' disease, and it is very important to know this.

(3) In certain patients the storage mechanism appears to act slowly, so that after a carbohydrate meal there is a quick rise in the blood-sugar to a high level, followed by a rapid fall to normal at the end of an hour, and this causes a transient glycosuria. These cases can be recognised by a sugar tolerance curve, which is of the "Lag" type.

(4) In true diabetes mellitus insulin is either deficient or inactive. As a result, carbohydrate cannot be oxidised or stored as glycogen, and the protein converted into glucose cannot be used, so the blood is filled with useless glucose which is excreted freely in the urine. In severe cases inability to oxidise sufficient glucose to ensure the proper metabolism of fats leads to more serious complications. Products of incomplete fat metabolism, acetoacetic acid and  $\beta$ -oxybutyric acid accumulate in the blood and are excreted in the urine. It is these acid substances which are the cause of diabetic coma. From this it can be seen that in a severe case of diabetes not only is carbohydrate useless as a food, but approximately half the protein is also converted into useless glucose and the remaining constituent, fat, besides being incompletely oxidised, causes the formation of toxic substances which may ultimately be the cause of death.

Treatment of these widely different causes of glycosuria depends on accurate diagnosis. Renal glycosuria, abnormalities of storage and mild diabetes can often only be distinguished with certainty by a sugar tolerance curve, and in cases of doubt

this should always be done. In more severe cases of diabetes even the resting blood-sugar is so much above normal that diagnosis can be made on the clinical history and on one blood-sugar reading alone. The presence of acetone bodies in the urine will also support the diagnosis. In such severe cases a sugar tolerance curve is superfluous.

The following are some examples of mistakes in treatment due to inaccurate diagnosis:

Male. Age 31. Clerk. At the age of 28 his doctor found sugar repeatedly in the urine. He had no symptoms suggestive of diabetes, but had been "run down" for some weeks. He was then, without further tests, put on a diet of approximately: carbohydrate 100 gm., protein 75 gm., and fat 150 gm. On this, glycosuria was controlled. He had, however, never felt really fit since that time, and had recently been feeling weak and unable to do very much. His urine was found to be normal, but a sugar tolerance test showed the following: fasting blood-sugar 0.08 per cent. After 60 gm. glucose, blood-sugars taken at half hourly intervals were: 0.14, 0.17, 0.13, 0.09, 0.08. Specimens of urine passed at the end of one hour and two hours both contained sugar, but at the end of three hours were sugar free. This shows that his glycosuria was due to a low renal threshold for sugar and that there was no evidence of diabetes.

Restriction of diet here was quite unnecessary, and the symptoms were due to lack of food. On a full diet he soon felt perfectly well.

Male. Age 40.<sup>1</sup> Insurance agent. He was sent to the out-patient department suffering from hyperthyroidism and chronic pulmonary tuberculosis. Sugar had been found in his urine, and because of

<sup>1</sup> Reported previously. Cole, L., *Brit. Med. Journ.*, 1938, i, 157.



this finding his loss of weight had been attributed to diabetes, and a diet of 100 gm. carbohydrate, 75 gm. of protein and 150 gm. of fat given. The glycosuria was actually a symptom of hyperthyroidism, and with his raised metabolism, chronic infection, and restricted diet he was going rapidly downhill. A change to a high caloric diet with plenty of carbohydrate led to rapid improvement and ultimately complete recovery.

Female. Age 50. Married. At the age of 47 this patient developed slight frequency, thirst, polyuria and loss of weight. She had always been fond of sugar and had been accustomed to take a great deal of carbohydrate. On examination her urine, on her ordinary full diet, was found to contain a great deal of sugar but no acetone. Her blood-sugar two hours after a meal was 0.24 per cent. She had immediately been put on a diet of carbohydrate 80 gm., protein 60 gm., and fat 120 gm., and her symptoms had cleared up and her urine had remained sugar free since. She had never, however, felt really well, but rather weak and usually hungry, and had lost considerable weight. It was found by trial that she was able to take a much fuller diet and remain sugar free with an approximately normal blood-sugar, and that on this she gained weight and felt perfectly well.

In this patient the original treatment was much too drastic. It would have been quite sufficient to cut down her excessive carbohydrate intake gradually until her glycosuria was controlled and her blood-sugar normal. By this method it would have been found that she was able to take 300 gm. of carbohydrate without restriction of protein or fat and maintain a normal urine and blood. Her continued symptoms were due to the fact that she had not been given enough food.

Glycosuria which is not due to diabetes does not need treatment by a restricted diet. It is of the utmost importance for every case to be investigated and diagnosed in order that unnecessary restrictions may be avoided and the doubts of the patient removed at the onset. Quite apart from the question of treatment, it is a serious thing for a patient with an innocent glycosuria to be allowed to live with the fear that he may have diabetes.

It is equally important not to mask a case of true diabetes by treatment before diagnostic investigations have been done. In a mild case this may happen if the patient is put on a restricted diet so that the glycosuria is controlled and the blood-sugar made normal before blood-sugar tests are made. This possibility has, however, only to be remembered for the mistake to be avoided.

*Diabetes mellitus.* General considerations: Diabetes varies very much in type and severity, and in treatment good results can only be obtained if the special needs of every case are appreciated. Broadly speaking, the disease is most severe and progressive in children and becomes milder with increasing age. Diet is an important part of treatment, but it is so dependent on insulin that the two cannot be considered apart. There is perhaps no disease in which it is more important to consider the psychological effects of treatment and to modify methods for this reason alone. Introspection is a great danger which can often be avoided if the right approach is made.

Diabetics, like normal people, show very great variation both in the amount of food and the relative proportion of protein, fat and carbohydrate they require. Not only have age, sex, weight, activity and occupation to be considered, but also individual tastes and idiosyncrasies. No diet is

satisfactory if it does not give a feeling of fitness while living a normal life. Generally speaking, the amount of food given should be near the minimum necessary to attain this and at the same time maintain a constant weight slightly below the previous normal in health. In every patient the aim should be normal growth and sexual development, normal activity, and a feeling of perfect health. Every diabetic should be trained to expect all this, and his diet and insulin should be adjusted to this end.

*Types of diabetes.* For convenience, the disease may be considered under five headings:

- (1) Diabetes in children.
- (2) Between 16 and 50 years.
- (3) Over 50 with symptoms.
- (4) Over 50 without symptoms.
- (5) Diabetes with obesity.

The special features of these groups will first be considered:

(1) Diabetes in children: This is acute, severe and progressive. Clinical symptoms are marked, ketosis is intense, and infections quickly induce coma. The blood-sugar is unstable, and its response to insulin and exercise sudden, so that hypoglycæmia easily occurs. As food has to be provided for growth, they need a larger diet and more protein in proportion to weight than an adult. All need insulin.

(2) Between 16 and 50 years: The disease is severe but tends to become milder in the fourth and fifth decades. The amount of food required depends largely on occupation and activity, and enough insulin must be given to maintain freedom from ketosis and glycosuria and a normal blood-sugar. In most cases this is possible, but in difficult cases

activity and freedom must not be sacrificed to biochemical standards.

(3) Over 50 with symptoms: The disease is comparatively mild, and with lessening activity less food is needed. Insulin should usually be given and the patient should always be taught how to use it, in case he develops an infection and needs it suddenly.

(4) Over 50, without symptoms: The disease is mild, and insulin often unnecessary. Many patients do well on a restricted carbohydrate diet with more fat, and do not need the higher carbohydrate diets used in younger people.

(5) Diabetes and obesity: The diabetes is usually mild, and it is more important to treat the obesity. The restriction of carbohydrate and fat which this entails automatically controls the diabetes. Except in young patients, insulin is usually unnecessary and is contra-indicated because it tends to increase weight.

*Methods of treatment.* At onset most patients with symptoms are best treated in a nursing home or hospital where diabetics are understood. They there learn how to arrange their diet, regulate and inject their insulin and test their urine for sugar, and also what steps to take should they develop hypoglycæmia or an infection. The value of this preliminary instruction and discipline cannot be insisted on too strongly, and it is very difficult to obtain the same results at home. Once patients have been well grounded in this way, their subsequent treatment can be managed more easily by their family doctor.

Full details of methods used in standardisation are outside the scope of this book, but the following instructions may be useful: In drawing up diets, tables showing the amount of protein, fat and carbo-



hydrate in different foods are needed.<sup>1</sup> Sample diets are given on pages 112-116.

(1) *Diet for children.* Children should be treated on the same lines as young adults, but they require relatively more food and protein. Treatment should be urgent and should, in the first instance, be in a hospital or nursing home.

(2) *Diet between 16 and 50.* The patient is first given a basal diet with sufficient insulin, and extra carbohydrate and fat are added according to his needs.

A basal diet is supplied by half a gramme of protein, half a gramme of fat,<sup>2</sup> and one gramme of carbohydrate per pound body weight. This yields approximately 10 calories per pound, supplies sufficient protein for ordinary needs, and gives a carbohydrate fat ratio of 2 : 1. It is a useful diet on which to start treatment and is easily calculated thus:

*Weight of patient:*

11 stone 6 lbs. = 160 lbs.

*Allowed:*

Protein	.	.	80 gm.	.	320 calories
Fat	.	.	80 gm.	.	720 calories
Carbohydrate	.	.	160 gm.	.	640 calories
					<hr/>
Total					. 1,680 calories
					<hr/>

This is insufficient for most patients leading an active life, who require anything up to 16, 20 or more calories per pound according to sex, age, occupation, weight in relation to their normal, climate, and taste.

The patient should be put to bed in most cases

<sup>1</sup> Lawrence, R. D. Food Tables for Five-Gram. Diet Scheme, Lond. These tables have been used for the diabetic diets in this chapter.

<sup>2</sup> For most patients it is unnecessary to weigh fats or protiens.

for the first few days, given a basal diet calculated according to his weight, and insulin in increasing doses, twice daily, 15 minutes before the main meal in the morning and evening, until the glycosuria and ketonuria are controlled and the resting blood-sugar is normal. One-third of the daily carbohydrate allowance is given after each dose of insulin. When balance has been attained he should be gradually allowed more exercise, and his diet increased by the addition of carbohydrate or fat, or both, giving a final ratio of 2, 3 or 4 of carbohydrate to 1 of fat until he is taking a diet on which he feels perfectly well while doing his ordinary work, and on which his weight remains constant. A patient who is greatly under his normal weight may need a fuller diet for a time until this has been made up, but the aim should be to maintain a constant weight a few pounds below the previous normal. This does not apply to obese patients (see Obesity). As the diet is increased it may be found necessary to increase the insulin also, but this is not always the case, for in many, with increasing activity, the carbohydrate and fat can be increased and the insulin reduced. This is partly due to increased carbohydrate tolerance from treatment, improvement following recovery from infection, or removal of septic foci, or the stimulating effect of carbohydrate on insulin secretion. When the patient first begins to lead his ordinary life various minor adjustments of diet and insulin have to be made, and for a very strenuous occupation protein may have to be increased up to 120 gm. per day. When standardisation has been completed, the weight and feelings of the patient are as important as urine and blood-sugar examinations.

In this way a diet is found which is adjusted to individual taste and activity and does not differ

very much from normal. It does differ, in that a diabetic must be careful to keep his diet as constant as possible in its main constituents and not vary it from day to day as freely as a normal person.

In many patients it is unnecessary to weigh any but the more concentrated carbohydrate foods: bread, cereals, potatoes, milk, root vegetables, and fruit. There is no objection to sugar or sugar-containing foods provided that they are strictly weighed and controlled. Green vegetables contain so little carbohydrate that the amounts taken make little difference. Proteins may be allowed in moderation according to taste. Fats, especially at the beginning of treatment, should be kept on the low side, particularly if ketosis is difficult to control, as it often is in children and young adults. They may be increased later according to response to treatment and taste. With war rationing it is less easy for patients to take excess fat. By this method it is sufficient to give detailed instructions as to the amount of carbohydrate allowed, usually initially from 150-300 grm. per day; how much of this should be taken at each meal; and general advice on moderation and regularity in consumption of proteins and fats. The advantage of weighing all foods including proteins and fats for the first few weeks is that it gives better control, and is good discipline for the patient.

(3) *Diet over 50, with symptoms:* In older patients less food is required and high carbohydrate diets are not so well tolerated and are not necessary. Relatively more fat and less carbohydrate than that suggested for younger patients makes control easier. It is usually only necessary to weigh concentrated carbohydrates and to allow protein and fat in moderation, unweighed, according to taste. Many patients over 50 leading a sedentary life may

feel well and keep in the best of health on 120-150 grm. of carbohydrate daily.

Over 50 the question often arises as to whether insulin need be given. Such borderline cases are those in whom the diet which keeps a patient sugar free is barely enough for an active life. Experience, and if necessary trial, answers this question, but patients should not be allowed to struggle on without insulin, undernourished but sugar free, when with it they could take a fuller diet and feel well. If sufficient food for health and maintenance of weight can be taken without insulin it is often justifiable to withhold it, but it is often advisable for the patient to be taught how to use it so that if he develops an infection he can use it at once without fuss. In old people it is undesirable to reduce the blood-sugar suddenly, either by diet or insulin. Many feel better with a raised blood sugar, and the dangers of over-dieting, even when glycosuria is present, must not be forgotten.

(4) *Over 50, without symptoms.* In many such patients a mild degree of diabetes only is present, which is easily controlled by slight or moderate restriction of carbohydrates. Insulin may be only needed if an infection develops. Elaborate dieting is usually unnecessary, and it is often sufficient to stop all sugar and cut down such foods as bread and potatoes. If this is done gradually, and the effect watched, the danger of excessive restriction is avoided. These patients often have a raised blood-sugar and a raised renal threshold and feel unfit if insulin is given to keep the blood-sugar normal. The danger of over-dieting must be remembered, and for this reason it is better to work downwards from the normal.

(5) *Diabetes and obesity.* In most, the diabetes is mild, and a reducing diet automatically controls it.



Carbohydrate and fat should be low enough to reduce weight without limiting activity. Insulin should be avoided when possible, as it tends to increase weight. When it is necessary to control glycosuria a single dose of protamine zinc insulin before breakfast is often sufficient, and this should generally not exceed 30 units. Over 50 it is usually unnecessary, and reduction of carbohydrate and fat to ensure a steady loss of weight and control glycosuria is the main indication.

Example: Female, aged 49, married. Complaint: pain in the back and breathlessness on exertion for one year, and frequency for six months. On examination 2 per cent of sugar was found in the urine. Her resting blood-sugar was 0.26 per cent. State: Very obese. Fat, pendulous abdomen. Weight: 15 st. 9 lb. Treatment: Massage, physical exercises, an abdominal belt and a reducing diet.

Progress: Urine sugar free in one week. After four months: All symptoms disappeared. Leading more active life and feeling well. Blood-sugar normal. Weight: 13 st. 10 lb.

*Diet and hypoglycæmia.* On ordinary insulin, hypoglycæmia tends to come on about four hours after the injection. If insulin retard or protamine zinc insulin are being used it may occur at other times. It is liable to occur if an abnormal amount of exercise is taken, and particularly when insulin dosage has previously been determined during or after an infection and has not been subsequently reduced. After standardisation in hospital or nursing home the increased exercise which follows discharge will often induce hypoglycæmic attacks if allowance is not made for this by increasing diet or reducing insulin. It is most liable to occur towards the end of the morning, and can then be prevented by a light lunch with 10 to 20 grm. of

carbohydrate about midday. Missing a meal may also cause it, and patients should always carry lumps of sugar or barley sugar with them to guard against this contingency. This is particularly important if they are in the habit of driving a car at these times. Hypoglycæmia caused by the slower acting insulins is more difficult to treat, and larger and repeated doses of sugar have to be given. It is very important to adjust diet and insulin directly the mildest symptoms appear.

*Diet and infections.* When a diabetic develops an infection his ordinary diet should be continued as long as he feels able to take it comfortably. If he has vomiting or diarrhœa, or for any other reason this is inadvisable, the equivalent daily allowance of carbohydrate may be given in the form of glucose or sugar, in water, lemonade or well-diluted milk in small feeds at frequent intervals. In severe infections such as pneumonia no attempt need be made to keep closely to the diet in health, but glucose may be given freely up to 200 gm. a day in solution at frequent intervals. Other foods may be given to taste, but fats, and therefore milk, should be kept low on account of the danger of acidosis. The dose of insulin should never be reduced, and usually has to be increased very much.

#### SAMPLE DIABETIC DIET (1)<sup>1</sup>

Weight of patient: 10 stone = 140 lb.

Basal diet allowing approximately 10 calories per pound. (0.5 gm. protein, 0.5 gm. fat, and 1 gm. carbohydrate per pound.)

Protein	.	70 gm.	×	4	=	280 calories
Fat	.	70 gm.	×	9	=	630 calories
Carbohydrate		140 gm.	×	4	=	560 calories

Total 1,470 calories

<sup>1</sup> For most patients it is unnecessary to weigh fats or proteins.

*Breakfast*

	C.	P.	F.
Grapefruit (no skin) 5 ozs.	5	—	—
Brown bread, 2 oz.	30	6	—
Milk, 7 oz.	10	7	7
Lean ham, 2 oz.	—	10	10
Butter, $\frac{2}{3}$ oz.	—	—	10
Tea or coffee	—	—	—
	45	23	27

*Lunch*

Brown bread, $\frac{2}{3}$ oz.	10	2	—
Potato, 2 oz.	10	1	—
Carrots, 4 oz.	5	—	—
White fish, 4 oz.	—	20	—
Stewed prunes, 2 oz.	10	—	—
Cream, 1 oz.	—	—	5
	35	23	5

*Tea*

White bread, $\frac{2}{3}$ oz.	10	1	—
Butter, $\frac{2}{3}$ oz.	—	—	10
Milk, $3\frac{1}{2}$ oz.	5	$3\frac{1}{2}$	$3\frac{1}{2}$
Tea	—	—	—
	15	$4\frac{1}{2}$	$13\frac{1}{2}$

*Dinner*

Clear soup	—	—	15
Roast mutton, 2 oz.	—	15	—
Potato, 2 oz.	10	1	—
French beans	—	—	—
Stewed apples, 4 oz.	5	—	—
Biscuits (unsweetened), $\frac{1}{2}$ oz.	10	2	—
Butter, $\frac{1}{2}$ oz.	—	—	12
White bread, $1\frac{1}{3}$ oz.	20	2	—
Coffee	—	—	—
	45	20	27

SAMPLE DIABETIC DIET (2)<sup>1</sup>

For male, age 30. Activity, moderate.

Weight of patient: 11 stone = 154 lb.

Allowance 16 calories per pound = 2,464 calories.

Protein . . . 80 gm. = 320 calories

Fat . . . 105 gm. = 945 calories

Carbohydrate. 300 gm. = 1,200 calories

Total      2,465 calories

*Breakfast*

	C.	P.	F.
Porridge (1 oz. raw oatmeal) .	20	4	—
Bacon, 2 oz. . . . .	—	10	15
Bread, 4 oz. . . . .	60	6	—
Milk, 7 oz. . . . .	10	7	7
Butter, $\frac{1}{2}$ oz. . . . .	—	—	12
Orange, 4 oz. (peeled) . .	10	—	—
	100	27	34

*Lunch*

Bread, 3 oz. . . . .	45	4 $\frac{1}{2}$	—
Butter, $\frac{1}{2}$ oz. . . . .	—	—	12
Cheese, 2 oz. . . . .	—	15	15
Tomatoes, 6 oz. . . . .	5	—	—
Banana, 1 oz. . . . .	5	—	—
Milk, 3 $\frac{1}{2}$ oz. . . . .	5	3 $\frac{1}{2}$	3 $\frac{1}{2}$
Tea or coffee . . . . .	—	—	—
Marmite . . . . .	—	—	—
	60	23	30 $\frac{1}{2}$

*Tea*

Bread, 2 oz. . . . .	30	3	—
Butter, $\frac{1}{2}$ oz. . . . .	—	—	12
Salad . . . . .	—	—	—
Marmite . . . . .	—	—	—
Tea . . . . .	—	—	—
Milk, 3 $\frac{1}{2}$ oz. . . . .	5	3 $\frac{1}{2}$	3 $\frac{1}{2}$
	35	6 $\frac{1}{2}$	15 $\frac{1}{2}$

<sup>1</sup>For most patients it is unnecessary to weigh fats or proteins.



*Dinner*

	C.	P.	F.
Clear soup . . . . .	—	—	—
Roast mutton, 2 oz. . . . .	—	15	15
Potato, 3 oz. . . . .	15	1½	—
Green vegetables . . . . .	—	—	—
Bread, 4 oz. . . . .	60	6	—
Stewed prunes, 4 oz. . . . .	20	—	—
Cream, 2 oz. . . . .	—	—	10
Apple, 4 oz. . . . .	10	—	—
Coffee . . . . .	—	—	—
	<hr/>	<hr/>	<hr/>
	105	22½	25
	<hr/>	<hr/>	<hr/>

SAMPLE DIABETIC DIET (3)<sup>1</sup>

For male, age 60, leading a quiet life.

Weight: 9 st. 4 lb. = 130 lb.

Allowance 12 calories per pound = 1,550 calories.

Protein . . . . .	65	gm.	×	4	=	260	calories
Fat . . . . .	90	gm.	×	9	=	810	calories
Carbohydrate . . . . .	120	gm.	×	4	=	480	calories
						<hr/>	
Total						1,550	calories
						<hr/>	

*Breakfast*

	C.	P.	F.
One egg . . . . .	—	6	5½
Bread, 2 oz. . . . .	30	3	—
Butter, ¾ oz. . . . .	—	—	18
Banana, 1 oz. . . . .	5	—	—
Milk, 3½ oz. . . . .	5	3½	3½
Tea . . . . .	—	—	—
	<hr/>	<hr/>	<hr/>
	40	12½	27
	<hr/>	<hr/>	<hr/>

<sup>1</sup> For most patients it is unnecessary to weigh fats or proteins.

*Lunch*

	C.	P.	F.
Roast beef, 2 oz. . . .	—	20	8
Potato, 2 oz. . . .	10	1	—
Green vegetables . . .	—	—	—
Bread, $\frac{3}{4}$ oz. . . .	10	1	—
Butter, $\frac{1}{2}$ oz. . . .	—	—	12
Stewed apple, 4 oz.. .	5	—	—
	<hr/> 25	<hr/> 22	<hr/> 20

*Tea*

Bread, 1 oz. . . .	15	1 $\frac{1}{2}$	—
Butter, $\frac{1}{2}$ oz. . . .	—	—	12
Salad . . . .	—	—	—
Marmite . . . .	—	—	—
Milk, 3 $\frac{1}{2}$ oz. . . .	5	3 $\frac{1}{2}$	3 $\frac{1}{2}$
Tea . . . .	—	—	—
	<hr/> 20	<hr/> 5	<hr/> 15 $\frac{1}{2}$

*Dinner*

Clear soup . . . .	—	—	—
White fish, 3 oz. . . .	—	15	—
Bread, 1 oz. . . .	20	2	—
Butter, $\frac{3}{4}$ oz. . . .	—	—	18
Grapefruit, 6 oz. . . .	5	—	—
Biscuits (unsweetened), $\frac{1}{2}$ oz. .	10	2	—
Cheese, 1 oz. . . .	—	7	7
Cream, $\frac{1}{2}$ oz. . . .	—	—	3
Coffee . . . .	—	—	—
	<hr/> 35	<hr/> 26	<hr/> 28

### INSTRUCTIONS TO DIABETIC PATIENTS FOR CONTINUATION OF TREATMENT

(1) Be careful to follow the instructions which have been given you about diet, and only vary them on the advice of a doctor.

(2) Continue to take the dose of insulin you have been ordered. If you find that you are passing sugar

in your urine this dose may be carefully increased. If you develop symptoms of over-dosage, the dose may be slightly decreased.

(3) Never stop your insulin except on the advice of a doctor.

(4) Never omit your meal after you have taken insulin. If for any reason this cannot be obtained, take an equivalent amount of carbohydrate, if necessary, in the form of sugar.

(5) If you develop any infection such as a severe cold, tonsillitis, influenza or bronchitis, or any skin infection such as boils, or an abscess, you will need more rather than less insulin, and will almost certainly pass sugar. With an infection *never* stop your *insulin*. Go to bed and send for a doctor.

(6) If you develop vomiting and cannot take your diet, do not stop your insulin, but take plenty of sugar in tea, milk and water, or lemonade. Go to bed and send for a doctor.

(7) If you develop symptoms of insulin over-dosage take some sugar, chocolate, or food containing sugar at once and rest. Remember that such symptoms are particularly liable to occur when unaccustomed exercise is taken. If they occur frequently the dose of insulin should be decreased or the carbohydrate in the diet increased. Always carry some sugar or chocolate about with you in case you need it.

(8) Be careful to keep all wounds and blisters clean so that they do not become infected. To this end, toe-nails should be kept short and tight boots avoided.

(9) Remember that while you are taking insulin you should feel perfectly well and strong. If you do not feel in normal health, or if you are gaining or losing weight excessively, you should consult a doctor.

## DISORDERS OF THE THYROID GLAND

*Goitre.* Simple enlargement of the thyroid gland in young people is most commonly due to lack of iodine, either from deficiency in the diet or failure of absorption. McCarrison has shown that iodine is not the only factor concerned in this, for the size of the gland is affected by alteration of other constituents such as excess of fat or lime, or deficiency of vitamins.

Simple goitre at puberty and in young adults can be cured in its early stages by small amounts of iodine, and at the same time any abnormalities such as vitamin deficiency should be corrected. In goiterous districts the use of iodised table salt which contains 3.5 gr. of sodium iodide to the pound and supplies the user with about 1-25 gr. of iodine daily is an efficient prophylactic. When, however, a goitre has been present for some years and structural changes in the gland have become fixed, diet has no effect and iodine, by increasing the amount of colloid in the gland, makes it firmer. In long-standing goitre with nodules, excess iodine, far from reducing the size of the gland, may stimulate thyroxin production and induce symptoms of hyperthyroidism.

*Myxædema.* This usually responds rapidly to treatment with thyroid extract. In severe cases with great obesity a reducing diet is helpful, and protein such as lean meat should be allowed freely for its stimulant action on metabolism. If anæmia is present excess of iron and vitamins should be given.

*Hyperthyroidism.* In exophthalmic goitre and toxic nodular goitre the thyroid is over-active, so that tissue breakdown and oxygen consumption are increased. To meet these increased demands a very full well-balanced diet should be given and the



patient encouraged to eat as much as he can (see page 148). Protein is necessary in moderate amounts to make up for tissue breakdown, but excess should be avoided on account of its stimulating effect on metabolism. Red meat may be given in small amounts once daily, but chicken, fish, eggs, and milk are to be preferred. Patients with hyperthyroidism feel the heat very much, and therefore strong tea, coffee, meat extracts, alcohol, pickles, spices, condiments and rich or highly flavoured food should not be given. Usually the appetite is very good, and a full plain diet can be given without trouble. In severe cases with gastrointestinal or mental symptoms the problem is very different. With a high basal metabolic rate, vomiting and inability or refusal to take food, there is rapid wasting, dehydration, and exhaustion, which can only be checked by radical methods. During preliminary observation inability to take enough food to maintain weight is a warning that too much time should not be wasted before treatment by thyroidectomy.

In hyperthyroidism glycosuria is often present, which is in most cases due to storage failure, and not diabetes. It is important to remember this, because no restriction of carbohydrate is called for (see page 102).

#### DISORDERS OF THE PARATHYROID GLANDS

The parathyroid glands regulate the utilisation of calcium salts in the body. Excessive formation of parathormone, as in adenomata, causes calcium to be eliminated from the bones so that the blood calcium is raised and excretion increased. Removal or under-activity causes a low blood calcium with secondary hyper-excitability of nerves and tetany.

Absorption of calcium depends on sufficiency of Vitamin D.

Disorders of the parathyroid are excessively rare, but hypoparathyroidism occasionally occurs either spontaneously or after thyroidectomy. In these cases tetany can usually be controlled by a high calcium diet, rich in Vitamin D, and if this is not enough, extra calcium lactate by the mouth. The chief articles of food rich in calcium are: green vegetables, milk, cheese, butter, eggs and nuts. The addition of lactose to the diet increases the absorption of calcium.

#### DISORDERS OF THE SUPRARENAL GLANDS

The cortex of the suprarenal glands regulates the sodium content of the body. In Addison's disease cortical hormone is deficient, and the amount of sodium falls so low that symptoms of dehydration, vomiting, diarrhoea and asthenia are produced. In many patients these can be relieved by a diet containing extra sodium, which is usually given in the form of sodium chloride. Some of this extra salt may be given with the food, but as 10 to 15 gm. have to be taken daily it is best given in emplets each containing 1 gm. It is suggested that a low potassium diet may also be of value in this condition.

#### GOUT

The exact cause of gout is not known, but at least two factors, heredity and diet, are concerned. The sufferers have an inborn abnormality of purine metabolism, which is shown by the tendency for the disease to occur in members of the same family in successive generations. In some this factor by itself is severe enough to produce the disease, and

this explains why gout affects people with frugal habits who have never touched alcohol. In others it is only when heredity is combined with dietetic excess that it develops. The chief predisposing causes are: excess of purines, especially animal purines, of meat and meat extracts, of food and of alcohol. Of the latter, strong wines like port, sherry, burgundy and claret, and champagne and beer are the most harmful.

Before an attack of acute gout the excretion of uric acid falls off and the amount in the blood often rises from the normal of 1 to 3 mgm. per cent to 5 or 6 mgm. This is followed by increased excretion, and the blood level falls again to normal. In chronic gout the blood uric acid often does not rise. Crystals of sodium biurate are deposited in the affected joints and as tophi in other parts.

In the absence of a full understanding of the causes, diet treatment is directed to reducing the intake of purines, avoiding other dietetic excesses, and stimulating free diuresis by giving plenty of water. When it occurs in patients addicted to high living, treatment by diet is often very useful, but in abstemious people little can be done in this way. It is important to remember this and not to over-diet for traditional reasons.

Diet treatment may be considered under four headings:

- (1) Restriction of purines.
- (2) Treatment of over nutrition.
- (3) Restriction of alcohol.
- (4) Promotion of diuresis.

(1) Restriction of purines: Sweetbreads, liver, kidney and brains contain large amounts of purines, and should be entirely forbidden. Purines are also present in relatively small amounts in other animal

foods such as meat, fish, chicken, milk, and eggs, but provided that these are only allowed in moderation they do no harm, and little is gained by complete restriction of animal food. They are also present in vegetable foods such as chocolate, cocoa, coffee, tea, oatmeal, peas, beans, and in smaller amounts in other cereals, fruits, and vegetables, so that a purine-free diet would be very difficult to give. From the point of view of restriction of purines it is sufficient to forbid sweetbreads, liver, kidney, brains, cocoa, chocolate, coffee, and strong tea.

(2) When over-nutrition or obesity are present they should be treated by a reducing diet, and in all cases the aim should be to give enough food for comfort and the degree of activity allowed, but no more. All rich and highly flavoured foods should be avoided and the diet should be consistently plain and easily digested. It is not necessary to restrict all red meat, but in many patients this is worth while for a time. Protein is best given in the form of white fish, chicken, eggs, and milk. Fats should be restricted, because a high-fat, low-carbohydrate diet tends to raise the level of uric acid in the blood, and also to reduce weight. Carbohydrates should be allowed in moderation according to the previous dietetic history. If there is obesity they must be reduced. Tender fruit and green vegetables should be allowed, with the exception of rhubarb, strawberries, spinach, and asparagus, which are rich in oxalates. The latter should be forbidden because of the tendency to oxaluria in patients with gout.

(3) Restriction of alcohol: In gout it is best to forbid all alcohol. In special cases, when this is undesirable, small amounts of good, well-diluted whisky are the least harmful. All red wines, liqueurs and beer should be strictly forbidden.



(4) Promotion of diuresis: To promote diuresis and lessen the tendency to oxaluria, plenty of water (3 to 4 pints daily) should be drunk. This should be taken on rising and between meals. Mineral waters such as those of Vichy or Contréxeville are sometimes a useful alternative to plain water.

## CHAPTER SEVEN

### CARDIOVASCULAR SYSTEM

**GENERAL CONSIDERATIONS.** In cardiac disease, apart from direct therapeutic measures the aim is to lighten the work of the heart. This is achieved partly by physical and partly by metabolic rest. All food has a stimulating effect on metabolism, increasing the consumption of oxygen and therefore indirectly the work of the heart. The amount of food given should, therefore, be as low as is compatible with the immediate needs of the body. In prescribing such a diet care must be taken that it contains all normal constituents, and that restrictions are not so severe that they themselves limit health and activity. A low diet has the further advantage that it tends to reduce body weight.

The vagus nerve supplies the heart and also the stomach and intestines, so that any irritation of the gastro intestinal tract may reflexly affect the heart. To avoid this, food should be bland and given in a soft, finely divided form.

The stomach and splenic flexure of the colon, although separated from the heart by the diaphragm, are close to it, and distension of either of these organs by food or gas may mechanically embarrass its action. General intestinal distension may also have the same effect. For this reason, all bulky foods should be avoided, and starch and cellulose given only in small amounts.

When congestive failure is present the stomach, intestines, and digestive glands are engorged, and digestion, absorption, and metabolism are impaired. For this reason food should be easily digested and absorbed and given in small amounts

at frequent intervals. Because there is retention of fluid in the tissues which cannot be eliminated by the impaired circulation and congested kidneys, the amount of fluid should be kept low and additional salt should not be given.

Finally, as the appetite is usually impaired, food should be as appetising and tempting as possible, and in order that flatulence and intestinal discomfort may not interfere with sleep, food given in the evening should be particularly light and digestible.

The diet in different types of cardiac disease will now be considered in greater detail:

(1) *Severe congestive heart failure with œdema.* Diet should be bland and fluid or semi-fluid. While the urinary output is low the fluid ration should not exceed two pints daily. No additional salt should be given. The following are allowed:

Milk and water, milk, Benger's, weak tea, weak coffee, lemonade and orangeade made with fresh lemon or orange juice and glucose, barley water, chicken broth, fruit juice, fruit jelly, egg lightly poached or scrambled, toast or rusk, butter, Marmite, honey, syrup, minced boiled chicken or steamed white fish.

Alcohol: Dilute whisky up to three ounces daily.

Meals should be small and frequent (two- to four-hourly), and should not exceed six ounces in fluid bulk.

(2) *Congestive heart failure during convalescence.* Diet should be as in (1) but more solid food may be allowed, as follows:

Tender lean ham, boiled mutton, sweetbread, rabbit, brains, tripe, mashed potato, plain biscuits, sponge cake, plain cake, ground or flaked rice, custard, junket, and small helpings of tender vegetables such as cauliflower, vegetable marrow, and stewed apple.

Fluids should be taken between meals, which should be eaten slowly and masticated thoroughly.

Additional vitamins may be given in the form of concentrates. Marmite is a useful source of Vitamin B.

Alcohol should be in the form of dilute whisky, dry sherry, or white wine.

(For details see Diet Sheet, page 130.)

(3) *Compensated myocardial disease.* Diet should be qualitatively as in (2), the amount of food allowed depending on the activity and personal feelings of the patient. The diet must be full enough to prevent feelings of hunger or weakness, but apart from this should be kept low. The patient should be weighed regularly, at least once a fortnight, and any tendency to increase in weight should lead to an inquiry into diet and any necessary adjustment. It must, however, be remembered that an increase in weight, especially when associated with increased breathlessness or exertion out of proportion to the increase, may be due to latent œdema, and may be the first warning of congestive failure.

Four small meals should be taken daily, and the evening meal should be particularly small and digestible. Food should be eaten slowly and thoroughly masticated, and should be preceded and followed by a period of rest of at least thirty minutes. Fluids should, if possible, be restricted to two pints daily and should be taken between meals. Sugar or glucose should be taken freely.

Alcohol may be allowed as in (2), but should be strictly moderate.

Smoking: One or two cigarettes, or one pipe, may be allowed after meals to some patients.

The following should be avoided by all cardiac patients:

Hurry over meals and exercise immediately before



or after; over-distension of the stomach, and fluid with meals; bulky foods, such as vegetables and fruit, in anything but small amounts; starchy foods in anything but small amounts; heavy puddings, rich cakes and pastry, pips, skins and fibre from meat or vegetables; all rich or highly flavoured food; twice-cooked, tough, or indigestible meat; condiments, pickles and sauces; rich or thick soups; and alcohol, except as mentioned above. Beer and effervescent drinks should also be avoided.

It should be impressed on the patient that the conditions under which meals are eaten and the thoroughness with which food is masticated matter as much as the actual kind of food.

(4) *Coronary thrombosis and angina pectoris*. For the first week after a coronary thrombosis the diet should be as in severe congestive failure with œdema (1). After this it may be increased gradually to (2), according to the symptoms. During the period of rest, however, the diet should be kept low if there is a tendency to put on weight, because it is important for the weight to be kept down.

Immediately after an attack of angina pectoris No. 1 diet should be given and increased to No. 2 after 24 hours or longer, according to severity. Between attacks the precautions observed in compensated myocardial disease (3) should be taken. It is very desirable to avoid anything which may irritate or over-distend the stomach or intestines, as this commonly precipitates an attack, probably reflexly through the vagus. Smoking should in most cases be forbidden.

(5) *Arterio-sclerosis and hypertension*. The advice given for compensated myocardial disease (page 130) should be followed (see Arterio-sclerotic kidney, page 82). If obesity or over-nutrition is present this is the most important condition to

treat, and great benefit may follow successful reduction. It is idle to suppose that severe restriction of protein and red meat will affect the arterial condition or the raised blood-pressure, and, while it is reasonable to prohibit all luxury consumption of protein, many patients feel fitter if they are allowed a moderate amount of red meat once daily than if it is completely forbidden.

(6) *Cardio-vascular disease and obesity.* When obesity is present in cardiac disease it is very important to treat it. In doing so the methods described for uncomplicated obesity may be used, but they should be applied slowly and with caution and carefully adjusted to the condition of the heart. Sudden reduction of diet should, where possible, be avoided.

The following are examples of the type of case in which a reducing diet has proved of great value.

(1) Male, aged 47. Occupation: General practitioner.

This patient gave a history of chronic bronchitis with increasing winter cough for five years; breathlessness on exertion getting worse for six weeks, and pain over the præcordium on exertion, with fluttering sensations in the chest. Examination in April 1936 showed the presence of chronic bronchitis and some emphysema. Clinically, the heart was found to be enlarged one inch to the left; there was a tic-tac rhythm and frequent extra-systoles. The resting pulse rate was 90. There was slight cyanosis; the blood-pressure was 140/90 and the electrocardiogram normal. His weight was 13 st. 12 lb.; height 5 ft. 7 in. The diagnosis was chronic bronchitis and myocardial weakness. Treatment consisted in gradually reducing the diet and increasing exercise, reducing smoking and ordering the

wearing of an abdominal belt. On May 20 he was much better and his weight was reduced to 13 st. 5 lb. On July 7 there were no symptoms; his weight was 12 st. 2 lb. and he was doing much of his practice on a bicycle. The improvement has since been maintained for over two years.

(2) Male, aged 62. In July 1937 he complained of increasing breathlessness on exertion, and slight giddiness of several months' duration. Examination revealed arterio-sclerosis, a blood-pressure of 190/110 and a pulse rate of 46. An electrocardiogram showed a 3 : 1 heart block. His weight was 14 st. 3 lb. After ten days' treatment with massage, mild graduated exercises, and a reducing diet his weight had fallen to 13 st. 4 lb. The symptoms of breathlessness and giddiness had disappeared and he felt much better.

(3) Female, aged 58. In May 1936 she came to hospital complaining of a gradual gain in weight for several years, and increasing breathlessness on exertion for six months. She had a high blood-pressure, 220/115, and a moderate degree of arterio-sclerosis. Her weight was 13 st. 6 lb. She was treated by a reducing diet, and later by one grain of thyroid daily. In four months her weight had fallen to 11 st. 7 lb., her blood-pressure was 210/110 and she felt well, in spite of the fact that she was leading a more active life.

(4) Female, aged 48. Following an attack of bronchitis she developed breathlessness, palpitations and præcordial pain on exertion. These symptoms persisted for two months in spite of the fact that she led an invalid life. She was then found to have a heart slightly enlarged to the left, with poor quality tic-tac heart sounds. Her blood-pressure was 140/80 and her electrocardiogram

normal. She had visceroptosis and varicose veins, and was rather too fat. Weight 11 st. 3 lb. She was treated by general massage, graduated exercises as she improved, an abdominal belt, injection of varicose veins, and a moderate reducing diet. Her weight fell gradually in four months to 9 st. 10 lb., and she was then feeling quite well and leading a fairly active life.

## DIET FOR CONGESTIVE HEART FAILURE

### *Aims:*

- (1) To give a low diet in a concentrated and easily assimilable form sufficient for the needs of the body at complete rest.
- (2) To avoid irritation or distension of the stomach.
- (3) To limit the fluid intake to  $1\frac{1}{2}$  to 2 pints daily (avoiding thirst).
- (4) To limit salt.
- (5) To give all vitamins.

### *General instructions:*

Give food mainly in a fluid or semi-fluid form in small feeds (2 to 8 ounces) every two to four hours while awake.

Feeds may consist of:

Milk and water, peptonised milk, Benger's.

Weak tea with milk and sugar, lemonade or orangeade made with fresh lemon or orange juice and glucose, barley water and glucose, fruit juice and glucose.

Chicken broth.

Fruit jelly, custard.

Egg and milk, egg (lightly poached, boiled or scrambled).

Toast or rusk.

Butter, Marmite, honey, syrup.

Minced boiled chicken or steamed white fish.

Alcohol, whisky or brandy as ordered.



## DIET FOR COMPENSATED HEART DISEASE

*Aims:*

- (1) To give enough food for the activity allowed by the heart and for a feeling of health.
- (2) To avoid over-nutrition and treat obesity.
- (3) To give small easily digested meals at regular times and a very light meal in the evening.
- (4) To avoid excess of salt.
- (5) To give all vitamins.

*General instructions:*

- (1) Obey the rules for simple dyspepsia (page 32).
- (2) Do not take additional salt with meals.
- (3) Do not take more fluid daily than is required to avoid thirst.
- (4) Keep a record of your weight so that any tendency to increase may be treated.

*Take*

Tender lean meat, chicken, white fish, rabbit, brains, sweetbreads, tripe, meat jelly.

Eggs, milk.

Mashed potato.

Stale bread, toast, rusks, plain biscuits.

Glucose, barley sugar, sugar, honey, fruit jelly, Marmite.

Butter in moderation.

Cream in moderation.

Soft fruit, tender vegetables; cereals, such as rice and semolina, and starchy foods, should all only be taken in small helpings.

If there is obesity, sugar, starch and fats should be reduced.

*Avoid*

Pips, skins, and all tough or fibrous parts of fruits, vegetables and meat.

All fried foods.

Dripping, lard, suet.

Pork, sausages, kidneys, liver.

Thick gravies and soups, strong meat extracts.

Salmon, salted fish, sardines.

Cheese.

Pastry, rich cakes, buns, all heavy puddings containing flour or suet.

Yorkshire pudding, porridge.

Raisins, currants, figs, nuts.

Pickles, spices, condiments, and highly flavoured foods.

Strong tea, strong coffee.

Aerated mineral waters.

Alcohol (unless specially allowed).

## SPECIMEN MENU

*On Rising*

Weak tea with milk and sugar, or glass of water with orange juice and sugar.

*Breakfast*

Grapefruit with sugar.

Lightly poached egg, toast and butter.

Honey or fruit jelly.

Weak coffee or tea with milk and sugar (one cup).

*Mid-morning*

Glass of milk with biscuit.

*Dinner*

Sweetbreads or steamed white fish.

Mashed potato. Tender greens (small helping).

Fruit jelly and cream.

*Tea*

Weak tea with milk and sugar (one cup).

Toast and butter. Honey.

Plain cake (one slice).

*Supper*

Boiled breast of chicken. Mashed potato.

Baked custard and fruit syrup.

*At Bedtime*

Milk or Ovaltine to taste.

## CHAPTER EIGHT

### ANÆMIA

THE factors essential for normal blood formation are: the anti-anæmic principle, iron, all vitamins, thyroxin, and traces of copper. Deficiency of one or more of these leads to anæmia.

The anti-anæmic principle is formed in the stomach by the interaction of Castle's intrinsic factor, which is present in normal gastric juice, with an extrinsic factor present in protein food. This substance is stored in the liver and utilised for blood formation. When it is deficient an anæmia, in which the red corpuscles are larger than normal, is produced, and this is called "macrocytic" anæmia. The commonest example of this type is pernicious anæmia, in which the intrinsic factor in the gastric juice is absent, so that anti-anæmic principle is not formed. Substitution therapy, with large amounts of lightly cooked liver, or liver extracts, remedies this defect so that blood formation is made normal. This form of anæmia, although not caused by dietetic deficiency, was at first treated by large amounts of liver in the diet. This method was difficult and unpleasant for the patient and has now been entirely replaced by concentrated extracts, best given parenterally.

Iron can only be absorbed from the digestive tract when it is in its inorganic form, and the organic iron present in many foods has first to be reduced to the ferrous state. This is done by the hydrochloric acid in the stomach. In anæmia due to lack of iron the red cells are smaller than normal, and this is called "microcytic" anæmia. This form of anæmia is usually due to the combined effects

of lack of absorption and increased loss. A diet containing insufficient iron, or a stomach with achlorhydria or hypochlorhydria, causes diminished absorption of iron, and there is increased iron loss in pregnancy, lactation and menstruation especially if excessive. This form of anæmia responds rapidly to large doses of iron.

Anæmia is found in conditions due to vitamin deficiency. Thus, beri-beri due to lack of Vitamin B<sub>1</sub>, pellagra due to lack of Vitamin B<sub>2</sub>, scurvy due to lack of Vitamin C, and rickets due to lack of Vitamin D all tend to develop a secondary anæmia. Such anæmias recover when the appropriate vitamin is given with additional iron. In addition to these clean-cut examples of vitamin deficiency, which are rare, anæmia is much more commonly due to slighter deficiencies of several vitamins. Such patients do not present any diagnostic features of vitamin lack, but are often merely ill and anæmic, and a careful inquiry into the diet which they have been accustomed to take often gives the best clue to diagnosis. Alteration of the diet and additional iron lead to steady improvement.

Anæmia in myxœdema may be due to lack of thyroxin, but care should be taken to exclude other causes.

Lack of copper is very rarely, if ever, the sole cause of anæmia in man.

Anæmia may also be caused by increased blood loss, as in hæmorrhage from a duodenal ulcer and by increased blood destruction as in acholuric jaundice. These forms respond to large doses of iron if the original cause is also removed.

In treating anæmias in which anti-anæmic principle or iron are deficient it must be remembered first and foremost that no faith must be placed in diet alone, but liver extract, stomach extract or



ferrous iron preparations must be given, the former preferably parenterally, the latter by the mouth. To suggest to a patient with pernicious anæmia that he shall take plenty of liver often gives him the impression that he is thereby treating his complaint, and this makes him slack about his injections. To treat pernicious anæmia properly with liver necessitates the taking of at least half a pound of lightly cooked liver every day, and very few people can do this for long with comfort. Similarly, iron is present in red meat, green vegetables and brown bread, but these foods are not a satisfactory alternative to large doses of iron by the mouth, and no reliance should be placed on them. It would be foolish, for example, to try and treat iron-deficiency anæmia in a baby with spinach.

In every patient with anæmia the diet should be full and well balanced, and contain red meat, green vegetables, brown bread, and all vitamins. If there is a suggestion of vitamin deficiency, vitamin concentrates should also be given. According to the cause, additional liver extract, iron, or both, should be given in appropriate amounts.

## CHAPTER NINE

# FOOD ALLERGY

THERE is no aspect of dietetic treatment which it is more important to consider than idiosyncrasy. In every diet prescribed the patient must have the last word as to its suitability, and this will often upset the nicest scientific calculations. Difficulties may arise in stubborn patients with strong likes and dislikes which have no physical basis, or they may be due to specific reactions which constantly follow the ingestion of the same kind of food. The latter effect is called "allergy", and is the name given to a state in which the normal reaction of the body to a particular substance, or group of substances, is changed. In general, an antigen-antibody reaction is its basic mechanism, but allergic reactions may occur to substances which are non-protein. It is often easy to distinguish between the extremes of personal dislike on the one hand and specific food sensitivity on the other, but between these two is no boundary, and the two become inextricably mixed. The cry "I don't like eggs" may be merely an expression of distaste, or of profound abhorrence based on complete physical incompatibility. To the dietitian each meaning is important, and he must also try to assess all the shades of meaning which lie between these two. It should be remembered that dislike may be a protection against foods to which the patient is allergic.

The allergic state is often inherited, occurring in many members of the same family, but when this is so, both the causes and symptoms they produce may vary in different members. Although in most the allergic tendency is inborn, its effects may be

intensified or abolished by extrinsic factors. Thus, repeated ingestion of large amounts of a particular allergen over a long period may, in a patient who has an allergic tendency, ultimately cause symptoms. Similarly, certain combinations of food or foods eaten under conditions of ill-health may lead to symptoms in those who have never before suffered. In every case of suspected food allergy it is important to enquire carefully into the family history for such troubles as hay fever, migraine, asthma, nettle rash, or the tendency to develop gastro-intestinal symptoms after taking certain foods.

Symptoms are varied and include asthma, rhinitis, migraine, urticaria, angio-neurotic œdema, purigo, and cardiac and gastro-intestinal disturbances. The latter include anorexia, nausea, vomiting, abdominal pain of a colicky nature, flatulence and diarrhœa. Sometimes symptoms are definite, and feelings of weakness and collapse follow the ingestion of certain foods, or there are aching pains in the joints and about the body. Loss of weight following loss of appetite may be a manifestation of the allergic state.

Diagnosis is easiest when there is a family history of allergy and the patient complains of particular symptoms which constantly follow the eating of a certain food. For this reason a careful enquiry into the past history and family history is of more value than any other examination. Many patients know that they are sensitive to certain foods and can state definitely that if they eat a banana they develop swelling of the face, or that sardines always bring on an attack of nasal irritation and catarrh. The only other point to determine then is whether they are sensitive to other foods which are not so obviously the cause of their symptoms. It is

important to remember that the same patient may be sensitive to more than one food. In children and patients with more constant and indefinite symptoms diagnosis is more difficult. Other indications that the symptoms are allergic are the rapid response of the symptoms to adrenalin therapy, given either by hypodermic injection or nasal spray, or to ephedrine by the mouth. A marked eosinophilia during the attack also suggests an allergic state. In an attempt to obtain more specific information skin reactions are used and are occasionally useful if they are considered in conjunction with the points already mentioned. Their practical value is very limited. Patients who are known to be sensitive to a particular food often fail to give a reaction with a skin test; on the other hand, skin tests are often positive to foods which have been taken for years and which, when withdrawn from the diet, have no beneficial effect on the symptoms. When other methods have failed they may be worth trying.

“Elimination” and “Addition” diets are also used for diagnosis. Elimination diets, first suggested by Rowe,<sup>1</sup> are diets designed to exclude certain foods which it is known are likely to cause allergic symptoms. Particular foods or groups of food are excluded from the diet for a given period and the effect on the symptoms noted until the exclusion of a certain one is found to give relief. As wheat is a common cause of allergic symptoms, he suggests rice or rye bread as a substitute for wheaten bread. This method is difficult to apply when the symptoms are varied and inconstant. In “Addition” diets, after 24 hours fasting, and a good purge, foods are added gradually one by one, preferably starting with meat, until the addition of

<sup>1</sup> *A.J.M.A.*, 1928, xci, 1623.



a certain food is found to cause symptoms. The complete removal of this article of diet may then bring relief.

The diet treatment of food allergy consists in the avoidance of the particular food or foods which are the cause of symptoms. Success depends on accuracy of diagnosis and the care with which the diet is drawn up and followed. The following is a list of some foods which are known to be the cause of allergic symptoms:

*Milk:* Cow's, goat's, dried, tinned. Sometimes boiled milk can be taken when raw milk causes symptoms.

*Eggs:* Various sorts. Yolk or white may each cause symptoms.

*Cheese.*

*Cereals:* Wheat, oats, rice.

*Meat:* Beef, mutton, pork, veal, venison, rabbit, hare, game, salt beef.

*Fish:* Oysters and other shell fish, crab, lobster, prawns, shrimp, salmon, and other fish. Dried, tinned (sardines) or salted fish.

*Fruit and vegetables:* Banana, strawberry, raspberry, orange, tomato, potato, peas, beans, celery, parsnip, spinach, nuts, rhubarb, mushrooms, dates, figs, pineapple, preserved fruits.

*Miscellaneous:* Tea, coffee, cocoa, chocolate, yeast, spices, condiments.

*Alcohol:* Claret, hock.

A complete list would probably include every known kind of food prepared in every possible manner. It should be noted that the preparation of food in a certain way may make it allergic. Thus a child who cannot take raw milk may take it boiled. Salt beef and tinned salmon may cause symptoms in those who can take fresh beef and salmon with impunity.

The following conditions may be wholly or partly due to food allergy, and if so should be

treated on the lines suggested above: Asthma, allergic rhinitis, migraine, urticaria, pruritus, angio-neurotic œdema, cardiac irregularities, dyspepsia, diarrhœa, constipation and colic. In some of these there are other aspects of diet treatment to be considered, and these now follow:

*Asthma.* In some cases asthma is due to food allergy, and in these treatment on the above lines may ensure freedom from attacks. These cases are however in a minority and there are other aspects of diet to be considered.

The vagus nerve, stimulation of which causes constriction of the bronchioles, also supplies the stomach and intestines. This probably explains why gastro-intestinal symptoms are such a common prelude to an attack. In treating asthma this must always be remembered, and care taken to avoid gastric irritation or distension. To this end, the rules laid down for the treatment of dyspepsia should be followed (page 32). Meals should be light and plain. Fast eating and activity immediately before and after meals, bulky meals which distend the stomach, fluid with meals, and heavy or highly flavoured foods should be avoided, and as attacks are liable to occur at night the main meal should be taken in the middle of the day and a lighter one in the evening. Many asthmatics find it best to take their meals dry and restrict fluids to a minimum. Soups are often best avoided, and no food or drink should be taken in the evening after supper or after getting into bed.

In asthma, whether uncomplicated or associated with cardiac weakness or obesity, it is important to keep the weight low. Any tendency to put on weight should be met by a suitable reducing diet (see page 98).

In every case of asthma diet must be considered

from three aspects: (1) Food allergy; (2) Gastro-intestinal irritation; (3) Obesity.

*Migraine.* Patients with migraine often suffer from gastro-intestinal symptoms between attacks, and these should be treated on the lines described under dyspepsia (see page 32). Some patients respond to a fat-free diet with extra glucose. Chocolate is a frequent cause of migraine, and should be entirely forbidden unless it can be shown to be harmless.

*Urticaria, angio-neurotic œdema and pruritus.* In patients with skin irritation, apart from specific dietetic causes, there are certain points to be remembered. Any foods which tend to dilate the blood vessels of the skin and increase the flow of blood through them should be avoided. These are: alcohol, strong tea, coffee, mustard, pepper, horse-radish, pickles, spices, acid fruits, and strong meat extracts. For the same reason, no food should be taken very hot. Apart from this an ordinary plain diet with plenty of water to drink should be allowed. If there is constipation an anti-constipation diet may be very useful (see page 50).

## DIET FOR ASTHMA

### *Aims:*

- (1) To avoid irritation or over-distension of the stomach.
- (2) To avoid foods which are known to disagree.
- (3) To avoid over-nutrition and to treat obesity if present.

### *General instructions:*

- (1) Obey the rules for simple dyspepsia (page 32).
- (2) Take only light and easily digested food.
- (3) Take meals dry and restrict fluids to between one and two pints per day.
- (4) Do not take fluids just before bedtime.
- (5) Take the largest meal in the middle of the day and a light supper.

## CHAPTER TEN

# ACUTE AND CHRONIC INFECTIONS

**GENERAL CONSIDERATIONS.** In an acute infection with fever there is often nausea and vomiting, especially at the onset, and usually anorexia and constipation, while pain and malaise add to the general distaste for food. If the temperature is high there may be profuse perspiration and a highly concentrated acid urine. During fever metabolism is raised, tissue breakdown is increased, and the excretion of nitrogenous waste products rises. Under such conditions no attempt should be made to give more than a very light diet, and what is given should be determined largely by the feelings of the patient. The necessary requirements are: plenty of water, vitamins, sodium chloride, and sugar, preferably given in the form of glucose. Additional nourishment in a form easily digested and absorbed may be given if the patient can take it without digestive disturbance, but in acute infections of short duration no harm will come from temporary restriction of food provided that sufficient sugar is available to prevent acidosis. Plenty of sugar is particularly important in children who develop acidosis quickly. Because of this tendency and the intolerant state of the digestive tract, fats should only be given in moderation, and milk for this reason is not a good food unless diluted or well balanced by carbohydrate. Fluids should be given freely at all times, and what additional food is given should be in small amounts at two- or three-hourly intervals. Foods should not be given very hot, and ice, ice-cream and iced fruit



drinks are valuable and often much enjoyed. Solids should in the main be avoided, but small pieces of dry crisp toast or rusk are valuable in helping to keep the mouth clean and free from infection. If there is severe gastric disturbance, with vomiting, ice to suck, sips of iced soda-water or iced champagne often give relief (see Diet Sheet).

*Diet in acute infections with fever* (e.g. acute bronchitis, pneumonia, influenza, rheumatic fever, scarlet fever and measles). Feeds two- or three-hourly during the day, and, if awake, at night.

Three to six ounces of one of the following may be given at each feed:

*Orangeade:* Juice of two oranges, glucose two ounces and water to one pint.

*Barley Water.*

*Lemonade:* As above, but one lemon instead of two oranges.

Milk and water or milk and soda in equal parts. Glucose or sugar may be added to this to taste.

Chicken broth or mutton broth with salt.

Grapefruit juice and water with sugar.

The following may also be allowed to some patients:

Clear soup, Bovril, beef tea, meat jelly and thin slices of crisp toast or rusks. Benger's food, custard or junket. Fruit jelly, honey, Marmite and butter in moderation. Ice cream.

Additional fluids should be given freely if there is thirst, and water or lemonade should always be by the bedside at night.

The choice from the above should be left largely to the patient.

After one week, if the appetite returns, a fuller diet may be allowed, but additions should be made gradually, and the amount of fat should be kept low at first. Foods added should be plain, easily digested and absorbed, and unstimulating. Steamed

white fish, minced chicken, sweetbread, brains, lightly poached or scrambled egg, mashed potato, tender puréed vegetables, milk pudding, baked or stewed apple, plain cake and plain biscuits may be added gradually and finally tender meat.

*Typhoid fever.* Many different diets are used, ranging from very full to entirely milk. The choice between these two extremes is dictated by the desire, on the one hand, to give as full a diet as possible to support strength during a long and exhausting illness; and, on the other, to avoid giving anything which might irritate the inflamed and ulcerated bowel. Probably the diet of choice lies between these two, and there is clearly great scope for variation in cases of different degrees of severity.

In patients with well-marked clinical symptoms and signs and diarrhœa it is probably best and safest to give a semi-fluid entirely, as for any other acute infection with fever (see page 143). As, however, the illness is often prolonged for four to six weeks before the temperature is normal, and may last still longer, it is important to maintain strength by giving plenty of nourishing food, and this diet may be increased by the addition of egg beaten up in milk, cream soups, and milk puddings. If there is diarrhœa care should be taken that food is given tepid. If there is a tendency to develop tympanites, fluids should be reduced. The stools should be carefully watched, and if casts or blood appear the more conservative diet should be given. A finger of toast or rusk two or three times daily is valuable in helping to keep the mouth clean and warding off oral implications such as stomatitis or parotitis. In mild cases without marked constitutional or gastro-intestinal symptoms a much fuller diet may be given, such as that suggested for convalescence after acute infections.

*Tetanus.* This is an acute infection in which toxæmia is combined with prolonged involuntary physical exertion and profuse sweating. To give sufficient food and fluid to maintain strength is one of the problems in treatment which can only be overcome by a good nurse who seizes every opportunity to give nourishment. Prolonged basal anæsthesia with avertin is of great value in relaxing the spasm of the jaw and making feeding possible.

*Chronic infections.* In chronic infections such as pulmonary tuberculosis, with or without fever, diet must depend a great deal on individual peculiarities and requirements. In many the appetite is poor and needs tempting, and there is a tendency to lose weight, while to raise resistance to infection and improve the general health it is desirable to give a full diet. Even when the temperature is high, as full a diet as possible should be given, particularly when weight is being lost or is below the average. An exception to this is when a patient is fat and tends to put on weight rapidly.

The main requirements are, therefore: a full, well-balanced diet containing sufficient, but not excess of protein, as much fat as can be tolerated, and plenty of carbohydrate. Care should be taken to ensure that it is rich in vitamins, and it is often well to give excess of these in the form of vitamin concentrates. Anæmia is often present, and for this additional iron should be given as medicine. Foods of large bulk and low caloric value, such as green vegetables, should only be allowed in small amounts, as they take up space which might be more profitably used. It is most important to study patients' tastes and to serve food as appetisingly as possible.

For most patients with chronic infections a diet such as that recommended for wasting may be given (see page 148).

*Chronic rheumatic infections.* In chronic infections like rheumatoid arthritis and fibrositis many different causal factors are at work, and treatment depends on these. The beneficial effects of a certain diet in a particular case are often far-reaching, but there is no single regimen which should be used for all. There are a few general rules which are almost universally applicable, but apart from these diet must be directed to the treatment of associated disorders.

*General rules for diet:*

- (1) Do not take red meat more than once daily.
- (2) Avoid rich highly-flavoured foods, pickles, spices, strong meat extracts, strong tea, coffee and alcohol.
- (3) Take plenty of water to drink every day.
- (4) Take care that vitamins are not deficient.

Associated disorders may be partly or wholly the cause, or may add indirectly, to disability. For example, constipation and intestinal toxæmia may be the fundamental cause, or obesity the one additional factor which makes an arthritic patient bedridden.

In arthritis or fibrositis the following conditions may also be present, and should be treated by appropriate dietetic measures:

- (1) Under-nutrition (see page 148).
- (2) Over-nutrition and obesity (see page 98).
- (3) Hypotonic dyspepsia with achlorhydria and anæmia (see page 34).
- (4) Hyperchlorhydria (see page 33).
- (5) Constipation (see page 50).
- (6) Intestinal fermentation or putrefaction (page 65).
- (7) Allergy (see page 136).

Although a low diet may be useful for a time in certain patients, particularly those who have been over-eating, it is important to remember not to diet a patient unnecessarily so that he is weakened by lack of food.



## UNDER-NUTRITION AND WASTING

WASTING may be due to definite causes, such as carcinoma, diabetes mellitus, or tuberculosis. When such have been excluded there still remain a large number of cases in which under-nutrition is an important feature. Some are due to a low diet and some to failure to absorb food. Treatment is important, especially when wasting is an accompaniment of chronic disease, for to improve the state of general nutrition may be the surest way of raising resistance to infection and bringing about a cure.

In attempting this, the aim is to supplement a full diet with additional fat-forming foods, so that weight is increased and nutrition improved. The fat-forming foods are: glucose and other sugars, starches and fats, and these should be given in excess. Proteins are not stored as fat in the body to an appreciable extent, but they are metabolic stimulants. They should not therefore be given in excess of the amount required to replace wear and tear. Insulin, with glucose, is sometimes useful to increase weight.

In order to take concentrated foods in large amounts, bulky foods of low caloric value, such as green vegetables and fruit, should only be given in small helpings to supply vitamins and increase appetite. For the same reason, fluids should be drunk mainly between meals, and thick soups, which supply little nourishment but are very filling, should be avoided. It is important for meals to be served at regular times as appetisingly as possible. In attempting to give a fuller diet, due regard must

be paid to what has been taken in the past and changes made slowly, so that dyspepsia is not produced. It is most desirable to study the patient's likes and dislikes so that a food such as cream is not pushed beyond the limit of tolerance.

The great value of cheerful surroundings, change, and, in suitable cases, gentle exercise in stimulating appetite must always be remembered. Regular bowel action is also important.

The main aims and dietetic requirements are summarised below.

## DIET TO INCREASE WEIGHT

(For wasting and in under-nutrition.)

### *Aims:*

To supplement a full diet with additional fat-forming foods so that weight is increased and nutrition improved.

### *General instructions:*

- (1) Serve meals at regular times.
- (2) Serve food as appetisingly as possible.
- (3) Give concentrated foods of high nutritive value such as milk, eggs, butter, cream, sugar, and starch, in increased amounts.
- (4) Avoid bulky foods of low caloric value such as fruit and green vegetables, as they do not give value for space.
- (5) Drink fluids mainly between meals.
- (6) Take the juice of two oranges or one lemon daily.
- (7) Do not eat more than three ounces of lean meat daily.
- (8) Make additions gradually, so that digestive irritation is avoided.

*As addition to a normal diet take extra of the following:*

Milk, cream butter, olive oil, dripping, fat meat, suet, cheese.

Mayonnaise.

Cane sugar, glucose, honey, fruit jelly, jam, marmalade, sweets.

Milk puddings, custard, junket.

Baked puddings, light pastry, batter, plain cakes, sweet biscuits.

Bread, toast, breakfast cereals.

Potatoes.

Porridge.

Red meat (up to 3 ounces daily), chicken, game, fish.

Alcohol only in moderation to improve appetite.

Any food containing sugar, starch, or fat, of which the patient is fond.

*Avoid*

Strong tea, strong coffee, excess fluids and effervescent drinks.

*Avoid—except in small quantities*

Vegetables, fruits, salads, soup and lean meat.

SPECIMEN MENU

*Breakfast*

Porridge or cereal with cream, milk, and sugar.

Fish or egg dish.

Toast, butter, and honey (plenty).

Weak tea with half milk, and sugar.

*Mid-morning*

Milk, or cocoa made with milk. Sweet biscuits.

*Lunch*

Cutlet with mashed potatoes. Small helping of French beans.

Steamed chocolate pudding with cream.

Cream cheese with biscuits and butter.

Home-made lemonade or orangeade (fresh fruit and sugar).

*Tea*

Weak tea with half milk, and sugar (cream if desired).

Hot buttered scones.

Bread and butter, jam or honey.

Fancy cakes.

*Dinner*

Clear soup.

Roast chicken with bread sauce and gravy.

Roast potatoes. Asparagus and melted butter.

Castle puddings with jam or sweet sauce.

Coffee with milk and cream.

*At Bedtime*

Hot milk, Ovaltine or cocoa.



## CHAPTER TWELVE

### INFANT FEEDING

THIS is too large a subject to review in this book, but there are certain general considerations which are so important for the general practitioner that they will be briefly discussed.

*Breast feeding.* Breast milk is the best food for infants from birth to the age of six to nine months. Apart from the fact that it is the most complete and easily digested food, it contains anti-bodies against human infections which are absent in other milks. The composition of breast milk from a woman taking a normal diet varies but little, and failures to breast feed are nearly always due to abnormalities in quantity or to the way food is given. Difficulties from abnormality of composition are excessively rare. If a child on the breast who is being fed at regular times in a proper manner fails to thrive, the fault usually lies in the amount of milk he is getting. This may be too much, but is more usually too little. It follows that in difficult cases the most essential things to know are, firstly, the food requirements of the child, and, secondly, the amount of milk that he is getting.

The theoretical food requirements can be quickly calculated from the following data:

Up to the age of six months the average child requires 50 calories per pound. One ounce of breast milk gives 20 calories. The weight in pounds, multiplied by 5 and divided by 2, gives the number of ounces of milk needed per day.

*Example:* Weight, 9 lb.

Caloric requirements  $9 \times 50 = 450$  calories

Ounces of milk per day  $\frac{9 \times 5}{2} = 22\frac{1}{2}$  ounces

When a baby is under weight calculations should be based on the expected weight for the age rather than the actual weight, and an attempt made to increase feeds gradually up to this.

The amount of milk can only be accurately measured by test feeding, and in cases of doubt this should always be done, for it is impossible to know otherwise how much the child is getting. All that is required is a pair of accurate scales and weights down to  $\frac{1}{4}$  oz. Ordinary kitchen scales, with weights and a pan large enough to hold the baby, are quite satisfactory. The child is then weighed before and after every feed throughout the day, and the differences added together give the total amount of milk. It is not enough to test weigh for one feed only and multiply by the number of feeds, because the amount of each feed is not constant.

By this method the actual amount taken is found, and this must then be adjusted to the theoretical requirements if there is a discrepancy. Measures must be taken to increase or decrease the secretion of milk, and if these are not enough supplementary or complementary feeds must be given.

*Artificial feeding.* It is impossible to modify cow's milk to resemble human milk other than superficially. Quite apart from the actual total percentage differences of protein, fat and carbohydrate, the proteins and fats themselves are different. The percentages of salts and buffering capacity are also different, and cow's milk lacks anti-bodies against human infections. As cow's milk has to be sterilised, vitamin deficiencies are also liable to be produced. Finally, cow's milk is deficient in iron, containing only one tenth of the amount in breast milk.

In spite of these differences, many healthy infants will thrive on raw cow's milk, but the risk from infection is considerable unless "certified" milk

is given, and even this is not absolutely safe. For this reason it is always desirable to give it boiled or pasteurised. To make cow's milk more digestible it may be modified in various ways. It may be boiled or pasteurised, and these, besides producing safe milk, have the added advantage of making the curd finer and more digestible. It may be diluted down to one half its volume by water, and additional carbohydrate, or carbohydrate and fat, added to make the percentage composition correspond with that of human milk. The buffering capacity may be adjusted to that of human milk by the addition of one drachm of lactic acid (B.P.) to the pint of milk. This is a very digestible milk for delicate infants. It may be citrated by the addition of one or two grains of sodium citrate to the ounce, or diluted with lime water. The former method gives a fine digestible curd. Dried milks are very digestible and have the advantages that they are easily prepared, sterile, and can be obtained humanised, and with reduced fat (skimmed and half-cream) for delicate babies. Condensed unsweetened milk is also well digested, but sweetened it contains a very high percentage of sugar and very little protein and fat, and is an unsuitable food for babies who need a normal amount of food. Finally, milk may be peptonised. These are some of the commoner methods used in artificial feeding, and they all give good results if certain precautions are observed.

When a baby fails to thrive it is not often because the quality of the milk is wrong but because it is given in the wrong way or in the wrong quantity. Of the former, as in adults, irregularity and haste over meals are the most common causes of digestive troubles, but in the child they produce ill-effects more rapidly. Mistakes in quantity can usually be avoided if the theoretical requirements are calcu-

lated. The following method is simple and of great use:

The caloric requirements of a baby up to the age of six months is approximately 50 calories per pound. The caloric value of one ounce of cow's milk is 20 calories, of one drachm of sugar 15 calories, and of one drachm of fat 30 calories. With this data it is easy to calculate the caloric value of the day's food to compare with theoretical requirements.

The following is a simple example:

A child of four months, weighing 10 pounds, was failing to gain weight. He was having five feeds daily of five ounces each, made up of pasteurised cow's milk and boiled water (50 per cent of each) with one drachm of dextrimaltose and half a drachm of 50 per cent of cod liver oil emulsion added to each feed.

The theoretical caloric requirement is  $10 \times 50 = 500$  per day.

The caloric value of the food was:

Cow's milk, $12\frac{1}{2}$ ounces	=	250	calories
Dextrimaltose, 5 drachms	=	75	„
50 per cent cod liver oil emulsion, $2\frac{1}{2}$ drachms	=	37	„
		<hr/>	
Total		362	
		<hr/>	

In this case the replacement of  $7\frac{1}{2}$  ounces of water by the same amount of milk (an extra 150 calories) caused a normal gain in weight.

Additional sugar may be added in the form of lactose, glucose, cane sugar, or dextrimaltose. Of these the latter is usually best tolerated by artificially fed infants. Starch is often well tolerated after the age of six months, but should not usually be given before this.



Fat is least well tolerated by delicate children, and the allowance should be kept low while there are digestive troubles and increased carefully later when these have subsided. It may be given in the form of 50 per cent cod or halibut liver oil, or as New Zealand Cream, either added to feeds or from a spoon afterwards.

In all cases of artificially fed infants care must be taken to see that there is no vitamin deficiency and that the deficiency of iron in cow's milk is made up. Vitamins A and D may be conveniently given in the form of cod liver oil or as concentrates when the fat is being kept low, Vitamin B as Marmite, and Vitamin C as orange juice. Iron is best given in inorganic form, and one grain of iron and ammonium citrate may be given three times a day.

Lastly, every child must have enough fluid. The theoretical allowance of  $2\frac{1}{2}$  ounces per pound may not be enough, and if a child seems thirsty, and in hot weather, additional water should be given.

The acid test of successful feeding is the temper and the weight chart. If both these are satisfactory it is unlikely that the diet is wrong.

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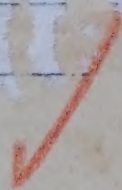
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